Crusader ENGINES



MARINE ILLUSTRATED PARTS MANUAL

MODEL MP8.1L

2001 - 2005 MY

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Contents:

"TYPICAL VIEWS ARE SHOWN"

ENGINE ROTATION

Engine Rotation is identified as "RH" or "LH" with the engine model number. Rotation always is determined from the flywheel end looking toward the front of the engine. In some instances, propeller shaft rotation may be opposite to that of the engine.

When ordering a replacement engine, production block or parts for the engine, be certain to check engine rotation. **DO NOT rely on propeller rotation in order to determine engine rotation.**

LEFT-HAND ROTATION is STANDARD ROTATION.

(Flywheel turns counterclockwise when viewed from flywheel end of the engine.)

RIGHT-HAND ROTATION is OPPOSITE ROTATION.

(Flywheel turns clockwise when viewed from flywheel end of the engine.)

HOW TO READ THIS PARTS BOOK:

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RB001018	**Base Engine Assembly**, 8.1L	1

(1) ITEM NUMBER - This number corresponds with the number in the exploded view on the facing page.

(2) PART NUMBER - This is the designated part number for the particular component or assembly.

(3) DESCRIPTION - This identifies what the component or assembly is.

(4) QUANTITY - This refers to the number of pieces used.

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Symbols shown throughout parts list are defined here or on the bottom of the individual parts list page.

AR	=	As Required
OPT	=	Optional
NSS	=	Not Serviced Separately
NA	=	Not Available
SS	=	Single Station Control
DS	=	Dual Station Control
OS	=	Oversize
US	=	Undersize
TBD	=	To Be Determined
NI	=	Not Illustrated

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REPLACEMENT PARTS:

WARNING:

Electrical, ignition and fuel system components on Crusader Engines are designed and manufactured to comply with U.S. Coast Guard rules and regulations to minimize risks of fire or explosion.

Use of replacement electrical, ignition and fuel system components which do not comply with these rules and regulations could result in a fire or explosion hazard and should be avoided.

GASKET AND DECAL KIT NUMBERS:

Description	Part Number
Complete Engine Overhaul Gasket Set	TBD
Valve Grind Gasket Set	TBD
Oil Pan Gasket Set	RM0263
Intake Manifold Gasket Set	RM0267
On Board Spare Parts Kit (FCC)	RK173087
On Board Spare Parts Kit (RTNLSS)	RK173087A
On Board Spare Parts Kit (MY ‘05, FCC)	RK173087-05
On Board Spare Parts Kit (MY ‘05, RTNLSS)	RK173087A-05

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MAINTENANCE ITEM PART NUMBERS:

Description	Part Number
Oil Filter	22679
Kit, Transmission Oil Filter (ZF)	RP077011
Fuel Filter, screen, Pre-Filter	R077012
Fuel Filter, screen,115 micron, Oberg	R077013
Fuel Filter, screen, Pre-Filter	RP077014
Fuel Filter, FCC	RP080026
Fuel Filter, element, Racor	47047
Spark Plugs	R030009
Spark Plug Wire Set	RK120019
Accessory Drive Belt	R066024
Accessory Drive Belt (MY ‘05)	R066024A
Impeller Kit	RP061017
Impeller Kit (MY ‘05)	RP061022
Thermostat	R026007

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CHANGE NOTICE:

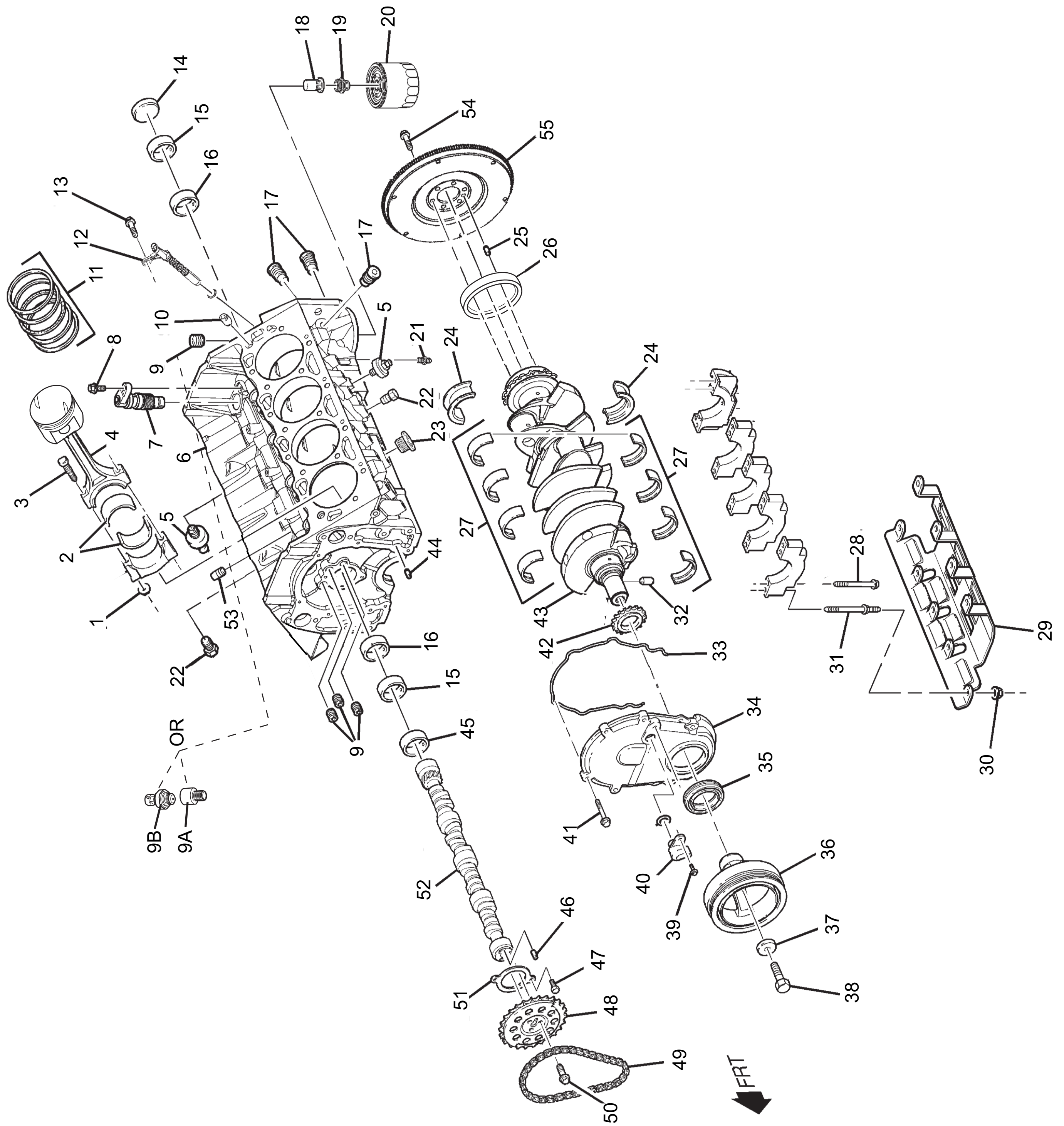
Change Pages	Date Updated
23, 50-51, 64-65, 73	05/07
47	10/07

MARINE TRANSMISSIONS:

Crusader Engines are equipped with Velvet Drive or Hurth Transmissions or “V”-drives. If transmission parts are required, contact your dealer or closest Crusader Parts Distributor for required parts.

Parts manuals and overhaul manuals are available through Crusader Distributors.

CYLINDER BLOCK ASSEMBLY - FIGURE 1

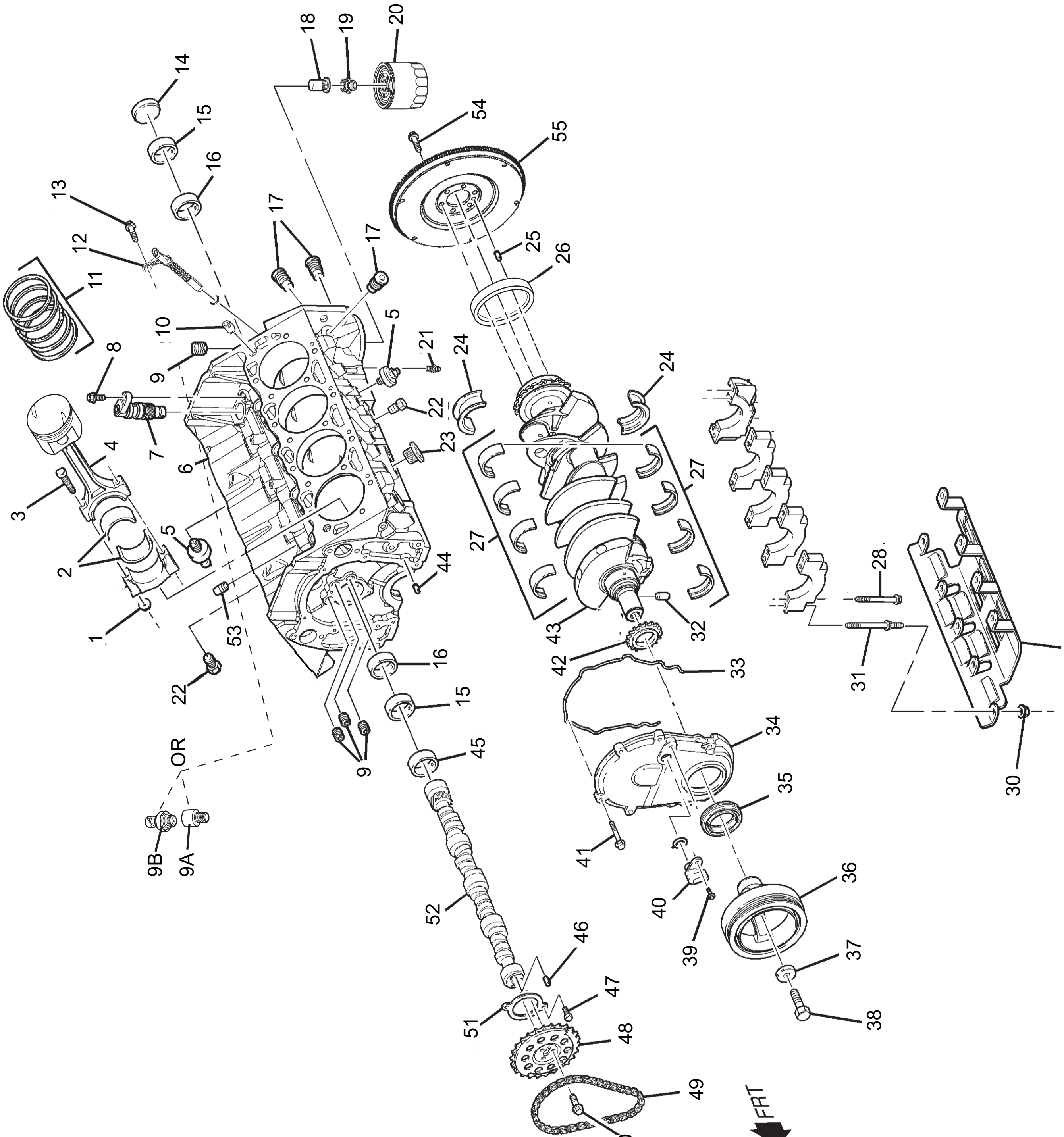


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CYLINDER BLOCK ASSEMBLY - FIGURE 1

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
*	RB001018	**Base Engine Assembly,** 8.1 STD, top mount starter	
*	RB001018A	**Base Engine Assembly,** 8.1 STD, bottom mount starter	
*	RB001019	**Base Engine Assembly**, 8.1 HO, top mount starter	
*	RB001019A	**Base Engine Assembly,** 8.1 HO, bottom mount starter	
1	R017080	**Nut**, connecting rod cap	16
2	R007026	**Bearing Set**, connecting rod (STD)	8
3	R009195	**Bolt**, connecting rod cap	16
4	RA013015A	**Piston and Connecting Rod Assembly** (LH/STD)	4
4	RA013015B	**Piston and Connecting Rod Assembly** (RH/STD)	4
5	R020033	**Sensor**, knock	2
6	NSS	**Cylinder Block**	
7	RA073001	**Drive**, oil pump	1
8	TBD	**Bolt**, oil pump drive	1
9	TBD	**Plug**, oil gallery	
9A	R024223	**Adapter**, oil pressure sensor (OEM specific)	AR
9B	R020048	**Sensor**, oil pressure (CAN-Bus) (OEM specific)	AR
10	R022021	**Pin**, cylinder head locating	4
11	R015012	**Ring Set**, piston (STD)	8
12	R020034	**Sensor**, crankshaft position	1
12	R020034	**Sensor**, crankshaft position (S/N 640118 and above)	1
13	TBD	**Bolt**, crankshaft position sensor	1
14	R069065	**Plug**, camshaft	1
15	R051039B	**Bearing**, camshaft #2 and #5	2
16	R051039A	**Bearing**, camshaft #3 and #4	2
17	TBD	**Plug**, engine block oil gallery	4
18	TBD	**Valve**, oil bypass	1
19	R079048	**Fitting**, oil bypass adapter	1
20	R079065	**Adapter**, oil bypass 8.1L	1
21	R024183	**Connector**, engine oil cooler hose	2
22	R069070	**Plug**, engine block coolant drain hole	2
23	TBD	**Plug**, engine block coolant drain hole	1
24	R007028	**Bearing**, crankshaft (thrust)	1
25	TBD	**Pin**, flywheel locating	2
26	R047224	**Seal**, crankshaft rear oil	1
27	R007027	**Bearing**, crankshaft (STD)	4
28	R009196	**Bolt**, crankshaft bearing cap	10
29	R012023	**Deflector**, crankshaft oil	1
30	TBD	**Nut**, crankshaft oil deflector	
31	R031032	**Stud**, crankshaft bearing cap	9
32	TBD	**Pin**, crankshaft balancer locating	1

CYLINDER BLOCK ASSEMBLY (cont'd) - FIGURE 1

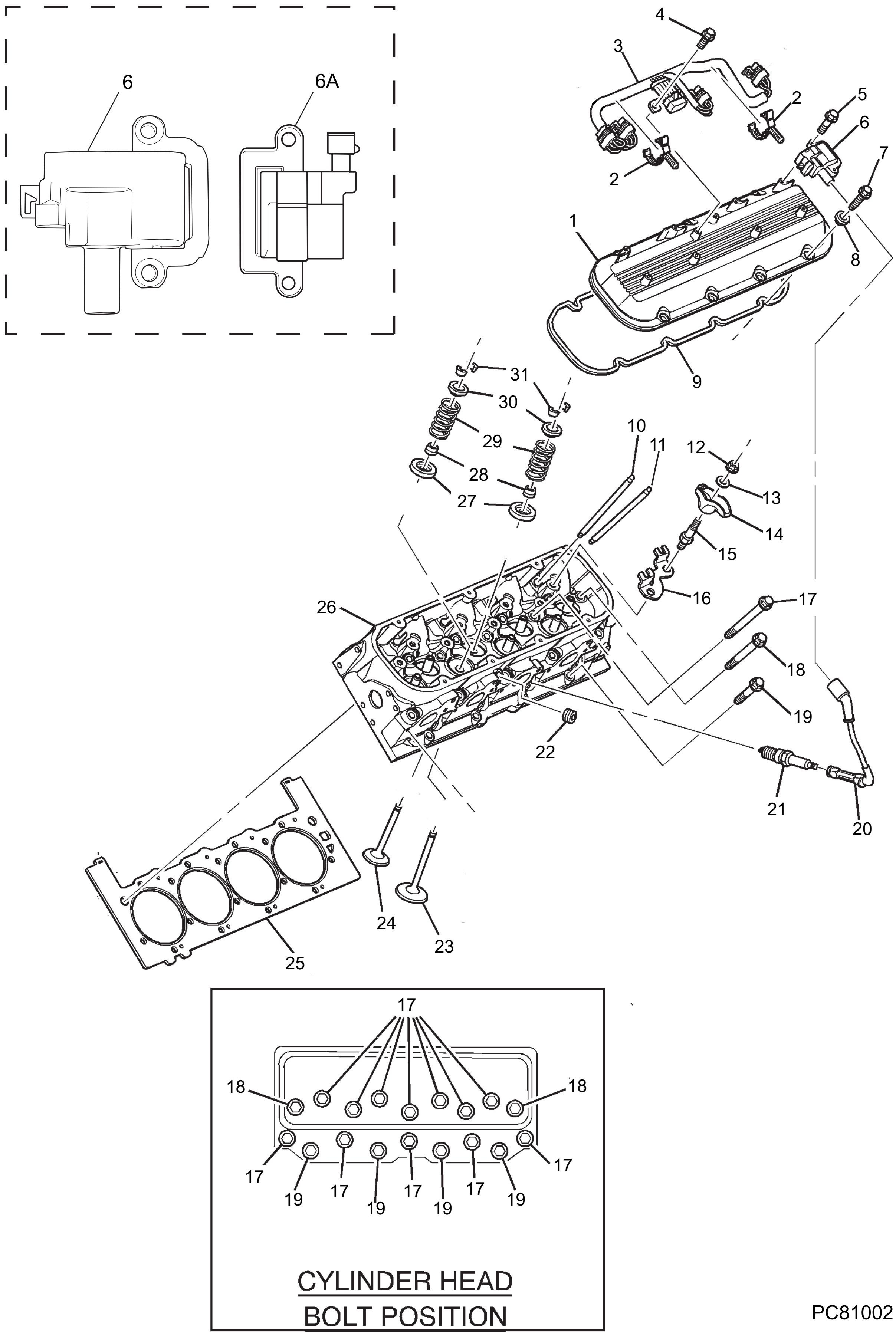


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CYLINDER BLOCK ASSEMBLY (cont'd) - FIGURE 1

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
33	RM0264	**Gasket**, engine front cover	1
34	R004011	**Cover**, engine front cover (includes gasket and seal)	1
34	TBD	**Cover**, engine front cover (includes gasket and seal, S/N 640118 and above)	1
35	R047225	**Seal**, crankshaft front oil	1
36	R064015	**Balancer**, crankshaft (STD - '01-'04) (HO - '03-'04) (Use with crankshaft R006029)	1
36	R064015A	**Balancer**, crankshaft (HO - '01-'02) (Use with crankshaft R006030)	1
37	R096146	**Washer**, crankshaft balancer	1
38	TBD	**Bolt**, crankshaft balancer	1
39	TBD	**Bolt**, camshaft position sensor	1
40	R020035	**Sensor**, camshaft position sensor	1
40	R020035A	**Sensor**, camshaft position sensor (S/N 640118 and above)	1
41	TBD	**Bolt**, engine front cover	6
42	R054039	**Sprocket**, crankshaft	1
42	TBD	**Sprocket**, crankshaft (S/N 640118 and above)	1
43	R006029	**Crankshaft** (STD - '01-'04) (HO - '03-'04) (Use with balancer R064015)	1
43	R006030	**Crankshaft** (HO - '01-'02) (Use with balancer R064015A)	1
44	R022022	**Pin**, engine front cover locating	1
45	R051039A	**Bearing**, camshaft #1	1
46	R022022	**Pin**, camshaft sprocket locating	1
47	TBD	**Bolt**, camshaft retaining	2
48	R054040	**Sprocket**, camshaft	1
49	R055016	**Chain**, camshaft timing	1
50	TBD	**Bolt**, camshaft sprocket	3
51	R109050	**Retainer**, camshaft	1
52	RA050023	**Camshaft**, engine (STD)	1
52	RA050024	**Camshaft**, engine (HO)	1
53	TBD	**Plug**, engine block oil gallery	3
54	TBD	**Bolt**, flywheel to crankshaft	6
55	RA138015	**Flywheel Assembly**, (Bottom Mount Starter)	1
55	RA138014	**Flywheel Assembly**, (Top Mount Starter)	1

CYLINDER HEAD ASSEMBLY - FIGURE 2

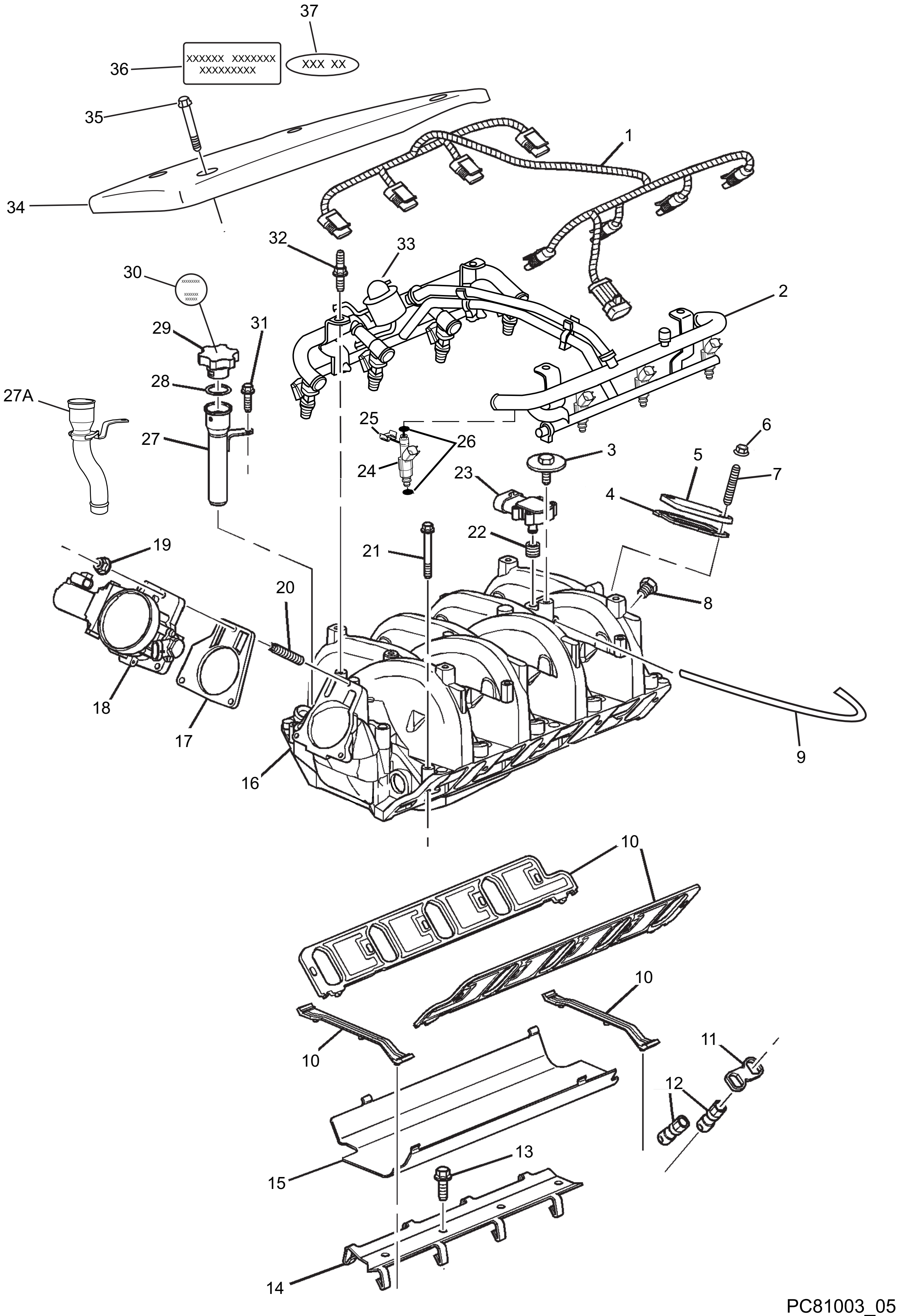


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CYLINDER HEAD ASSEMBLY - FIGURE 2

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R033013	**Cover**, rocker, OLD coils	2
1	TBD	**Cover**, rocker, NEW coils	2
2	R127096	**Retainer**, ignition coil wire harness	4
3	R121074	**Wire Harness**, ignition coils (OLD)	2
3	R121074A	**Wire Harness**, ignition coils (NEW)	2
4	TBD	**Bolt**, ignition coil wire harness retaining	2
5	TBD	**Bolt**, ignition coil retaining	16
6	R117012	**Coil**, ignition (OLD) (Standard - prior to S/N 621056) (H.O. - prior to S/N 630082)	8
6A	R117013	**Coil**, ignition (NEW) (Standard - S/N 621056 and above) (H.O. - S/N 630082 and above)	8
7	R009200	**Bolt**, rocker cover retaining	14
8	R094039	**Grommet**, rocker cover retaining	14
9	RM0261	**Gasket**, rocker cover	2
10	R039021	**Push Rod**, intake	8
11	R039022	**Push Rod**, exhaust	8
12	R017079	**Nut**, rocker arm attaching	16
13	R038012	**Ball**, rocker arm	16
14	R038018	**Rocker Arm**, valve	16
15	R095039	**Stud**, push rod guide attaching	16
16	R037003	**Guide**, pushrod	8
17	R009197	**Bolt**, cylinder head to block (long)	24
18	R009198	**Bolt**, cylinder head to block (medium)	4
19	R009199	**Bolt**, cylinder head to block (short)	8
20	RK120019	**Spark Plug Wire Set**	1
21	R030009	**Spark Plug**	8
22	TBD	**Plug**, pipe (1/2”)	2
23	R043033	**Valve**, intake (STD)	8
24	R043034	**Valve**, exhaust (STD)	8
25	RM0262B	**Gasket**, cylinder head (RH)	1
25	RM0262A	**Gasket**, cylinder head (LH)	1
26	R003014	**Cylinder Head Assembly (RH)**	1
26	TBD	**Cylinder Head Assembly (RH)** (S/N 640118 and above)	1
26	R003015	**Cylinder Head Assembly (LH)**	1
26	TBD	**Cylinder Head Assembly (LH)** (S/N 640118 and above)	1
27	R049013	**Rotator**, valve	16
28	R047226	**Seal**, valve stem	16
29	R046049	**Valve Spring Assembly**	16
30	R049014	**Cap**, valve spring	16
31	R049010	**Retainer**, valve stem	32

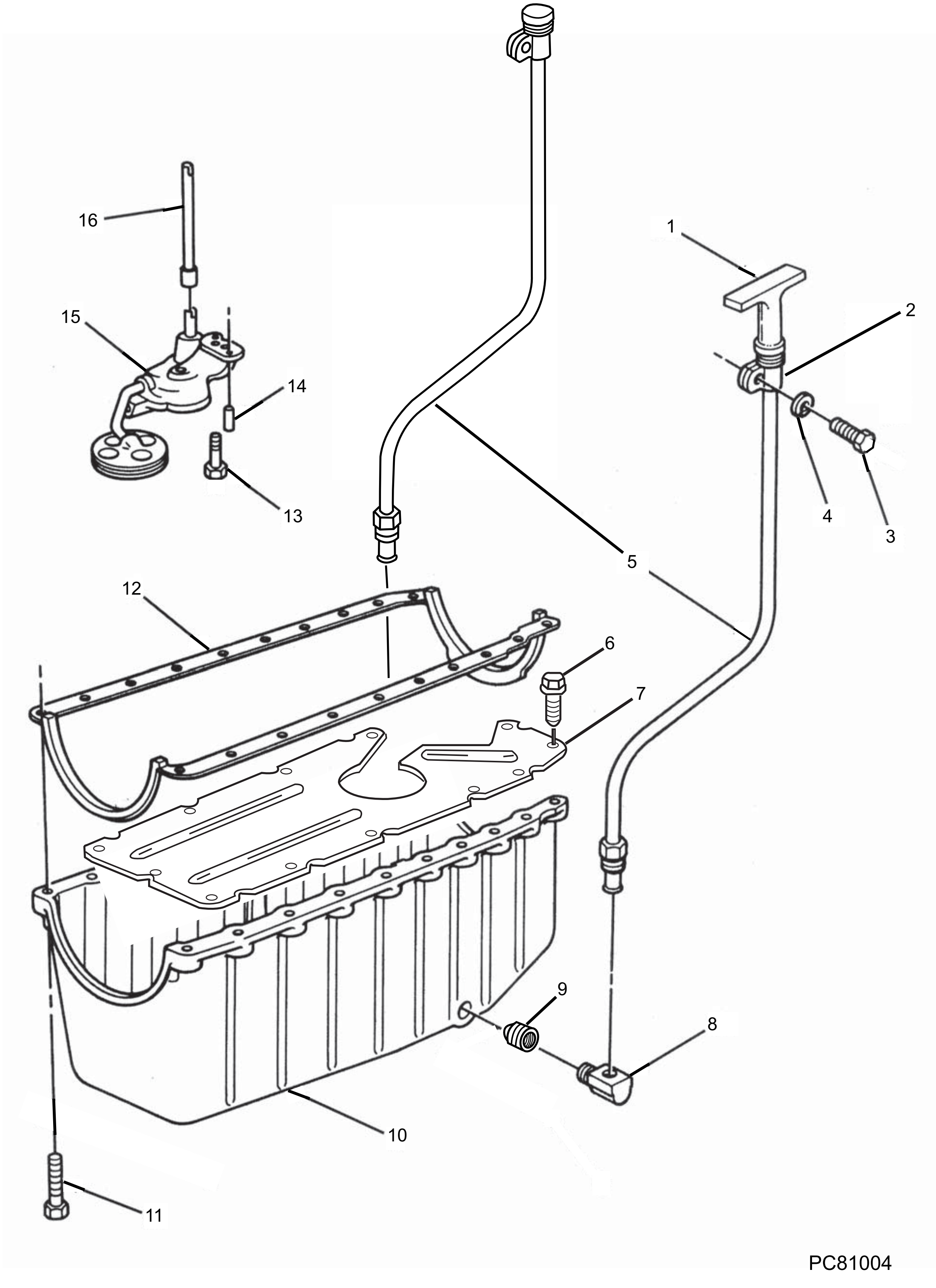
INTAKE MANIFOLD ASSEMBLY - FIGURE 3



INTAKE MANIFOLD ASSEMBLY - FIGURE 3

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R121075	**Wire Harness**, fuel injectors	1
2	RA086001	**Fuel Rail Assembly**	1
2	RA086001A	**Fuel Rail Assembly** (2005 FCC Fuel System)	AR
3	TBD	**Bolt**, MAP sensor retaining	1
4	RM0265	**Gasket**, EGR blockoff cover	1
5	TBD	**Cover**, EGR blockoff	1
6	TBD	**Nut**, EGR blockoff cover attaching	2
7	TBD	**Stud**, EGR blockoff cover attaching	2
8	TBD	**Plug**, intake manifold core hole	1
9	20237	**Hose**, fuel pressure regulator vacuum	1
10	RM0267	**Gasket Set**, intake manifold	1
11	R037004	**Guide**, valve lifter	8
12	R040004	**Lifter**, valve	16
13	TBD	**Bolt**, valve lifter retainer	4
14	R090253	**Retainer**, valve lifter	1
15	R012025	**Guard**, oil splash - lifter	1
16	R002022	**Intake Manifold**	1
16	TBD	**Intake Manifold** (S/N 640118 and above)	1
17	RM0251	**Gasket**, throttle body mounting	1
18	RA035036	**Throttle Body**, mechanical throttle (STD)	1
18	RA035036A	**Throttle Body**, mechanical throttle (HO)	1
18	RA035041	**Throttle Body**, electronic	1
19	49027	**Nut**, throttle body attaching	3
20	TBD	**Stud**, throttle body mounting	3
21	R009201	**Bolt**, intake manifold to cylinder head	10
21	TBD	**Bolt**, intake manifold to cylinder head (S/N 640118 and above)	10
22	TBD	**Seal**, MAP sensor	1
23	R020036	**MAP Sensor**	1
24	RA087006	**Fuel Injector Assembly**	8
25	R127097	**Retainer**, fuel injector to fuel rail	8
26	RK047227	**O-Ring**, kit fuel injector	8
27	R034046	**Riser**, oil fill (‘01-’02 MY)	1
27	R034046A	**Riser**, oil fill (‘03 MY to present)	1
27A	R034046B	**Riser**, oil fill (MY ‘05, OEM specific)	1
28	NSS	**O-Ring**, oil fill riser cap	1
29	R034038A	**Cap**, oil fill riser (‘01-’02 MY)	1
29	R034038B	**Cap**, oil fill riser (‘03 MY to present)	1
30	R143137	**Decal**, oil fill riser cap	1
31	98222020	**Bolt**, oil fill riser attaching	1
32	TBD	**Stud**, fuel rail assembly attaching	3
33	R088001	**Regulator**, fuel pressure	1
34	R060057	**Cover**, engine	1
35	99223030	**Bolt**, engine cover attaching	4
36	R143130	**Decal**, “CAPTAIN’S CHOICE”	AR
36	R143130A	**Decal**, “CRUSADER ENGINES”	AR
37	R143133	**Decal**, “8.1 MPI” (red/silver)	AR
37	R143133A	**Decal**, “8.1 MPI” (black/silver)	AR
37	R143134	**Decal**, “8.1 HO” (red/silver)	AR

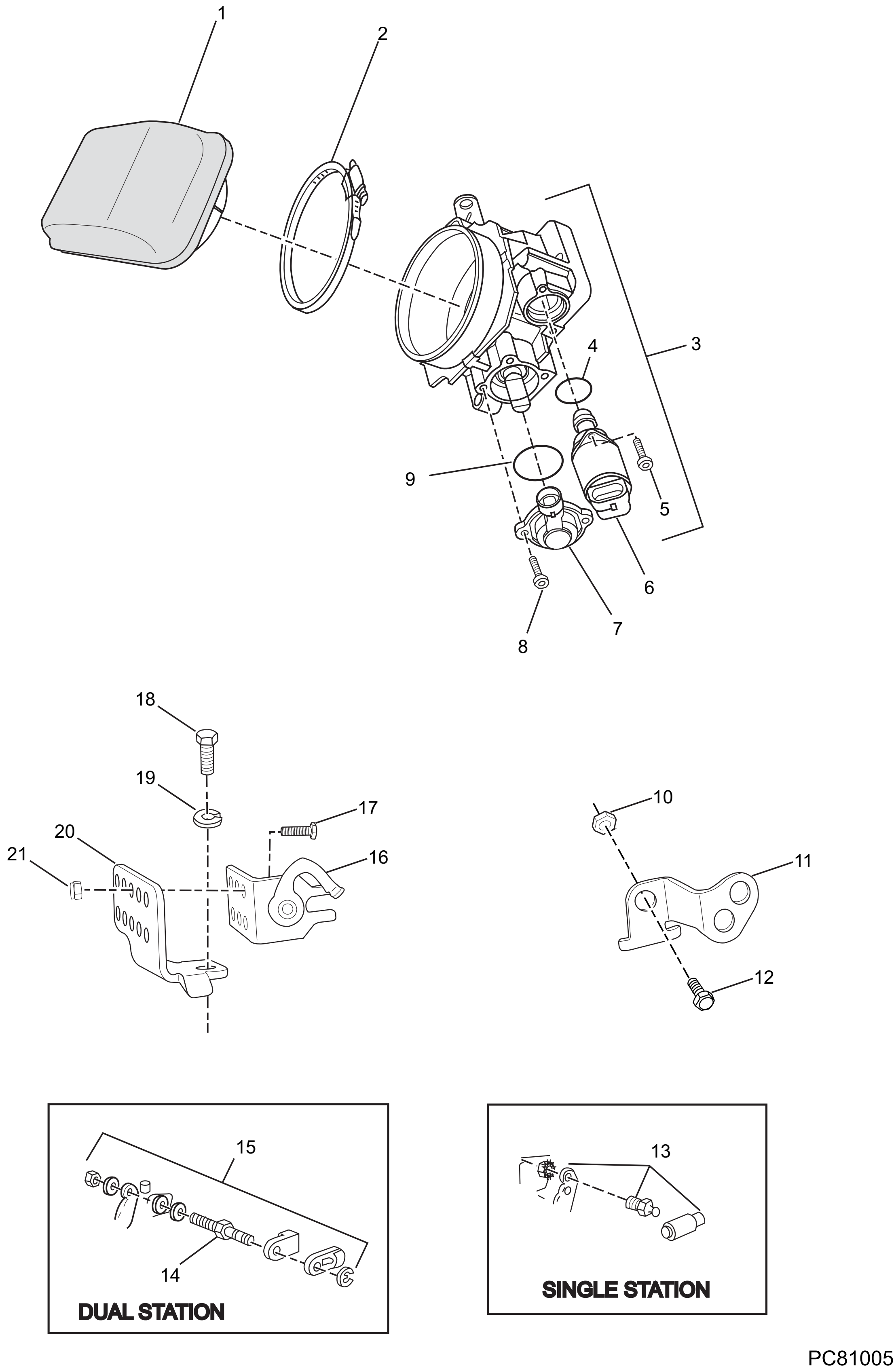
OIL PAN and OIL PUMP ASSEMBLY - FIGURE 4



OIL PAN and OIL PUMP ASSEMBLY - FIGURE 4

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R041068	**Dipstick**, oil level (Level)	1
1	R041069	**Dipstick**, oil level (Angled)	1
2	R127015	**Clamp**, dipstick tube attaching	2
3	98443025	**Bolt**, dipstick tube attaching	2
4	93940000	**Lockwasher**, dipstick tube attaching bolt	2
5	R041072	**Dipstick Tube**	2
6	TBD	**Bolt**, oil pan baffle	12
7	R012026	**Baffle**, oil pan	1
8	R024017	**Elbow**, dipstick tube to oil pan	2
9	R024200	**Adapter**, dipstick elbow to oil pan	2
10	R005023	**Oil Pan**	1
11	TBD	**Bolt**, oil pan mounting	20
12	RM0263	**Gasket**, oil pan	1
13	TBD	**Bolt**, oil pump mounting	2
14	R022022	**Pin**, dowel - oil pump aligning	1
15	RA070017	**Oil Pump Assembly**	1
16	R058055	**Shaft**, oil pump to oil drive	1
NI	TBD	**Kit**, oil drain	1

THROTTLE BODY and RELATED COMPONENTS - FIGURE 5

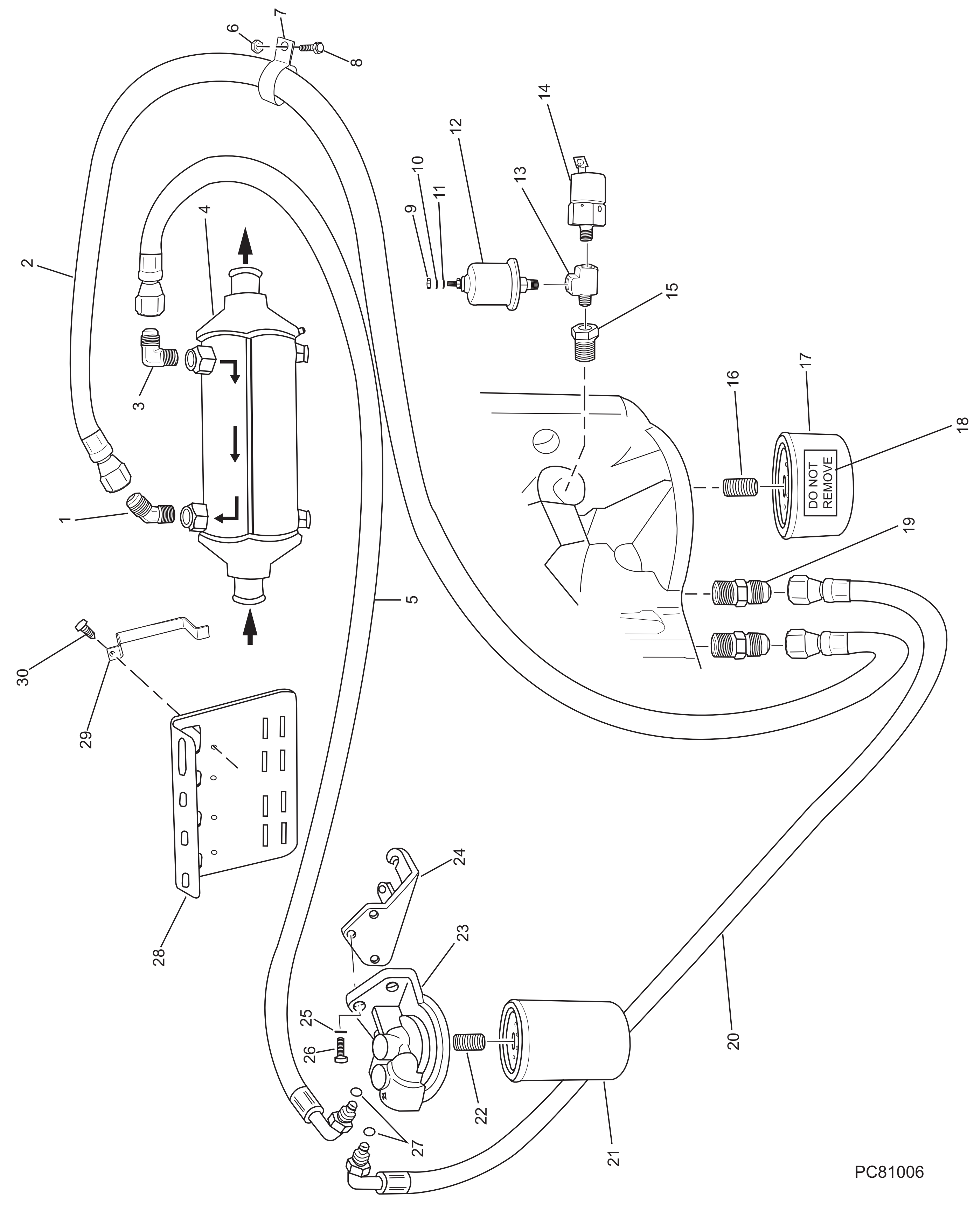


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THROTTLE BODY and RELATED COMPONENTS - FIGURE 5

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R145021	**Flame Arrestor**	1
2	RS3857	**Clamp**, retaining	1
3	RA035036	**Throttle Body Assembly**, STD	1
3	RA035036A	**Throttle Body Assembly**, HO	1
4	TBD	**O-Ring Seal**, idle air control valve	1
5	TBD	**Screw**, IAC valve attaching	2
6	R084003	**Valve**, idle air control	1
7	R020041	**Sensor**, throttle position	1
8	TBD	**Screw**, TP sensor attaching	2
9	TBD	**O-Ring Seal**, throttle position sensor	1
10	RS1078	**Nut**, retaining bolt	1
11	R090230	**Throttle Arm**, throttle body	1
12	RS0251	**Bolt**, throttle arm retaining	1
13	R178014	**Ball Joint Assembly**, cable attaching (single)	1
14	22978	**Pivot Pin**, cable attaching (dual)	1
15	23235	**Cable Attaching Kit**, (dual)	AR
16	R090086	**Cable Clip**, throttle attaching (single)	1
17	RS5122	**Bolt**, cable clip mounting	2
18	98223016	**Bolt**, bracket mounting	1
19	93920000	**Lockwasher**, bracket mounting	1
20	R090229	**Throttle Bracket**, intake	1
21	RS2055	**Locking Nut**, cable clip mounting bolt	2

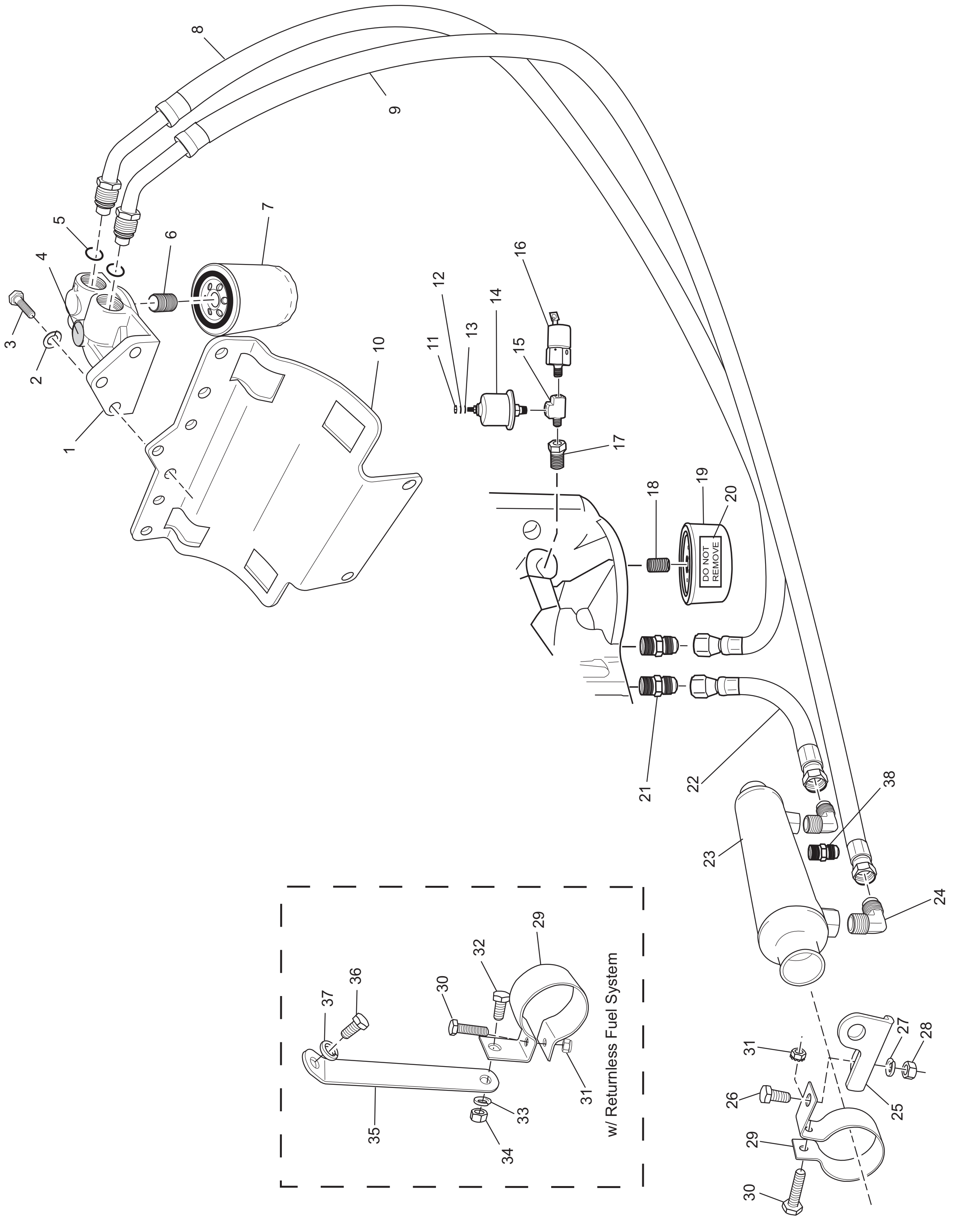
REMOTE OIL FILTER COMPONENTS (2001-2004) - FIGURE 6



REMOTE OIL FILTER COMPONENTS (2001-2004) - FIGURE 6

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R024150	**Fitting**, 45 degree	1
2	RA045121	**Hose Assembly**, cooler to filter header	1
3	R024184	**Fitting**, 90 degree	1
4	R147035A	**Cooler Assembly**	1
5	RA045120A	**Hose Assembly**, adapter to cooler	1
6	RS1078	**Nut**, strap clamp attaching	1
7	98315	**Clamp**, strap	1
8	90105125	**Bolt**, strap clamp attaching	1
9	95011000	**Nut**, sender terminal	1
10	95300300	**Lockwasher**, sender terminal	1
11	92300200	**Washer**, sender terminal	1
12	R020001	**Sender**, oil pressure (SS)	1
12	727046	**Sender**, oil pressure (DS)	AR
13	R024145	**Tee**, sender attaching	1
14	R020015A	**Switch**, oil pressure (SS)	1
15	RS3677	**Adapter**, sender attaching tee	1
16	R079048	**Fitting**, oil bypass adapter	1
17	R079065	**Adapter**, oil bypass	1
18	R143135	**Decal**, oil bypass adapter	1
19	R024183	**Fitting**, remote oil filter hose	2
20	RA045120	**Hose Assembly**, adapter to filter header	1
21	22679	**Filter**, oil	1
22	R024203	**Nipple**, header filter adapter	1
23	R079066	**Oil Filter Header**	1
24	R090226	**Bracket**, oil filter mounting	1
25	93930000	**Lockwasher**, header mounting bolt	3
26	99333020	**Bolt**, header mounting	3
27	R047245	**O-Ring**, oil line	2
28	R090194	**Bracket**, oil cooler mounting	1
29	R171007	**Strap**, cooler mounting	2
30	RS5115	**Bolt**, cooler mounting strap	2

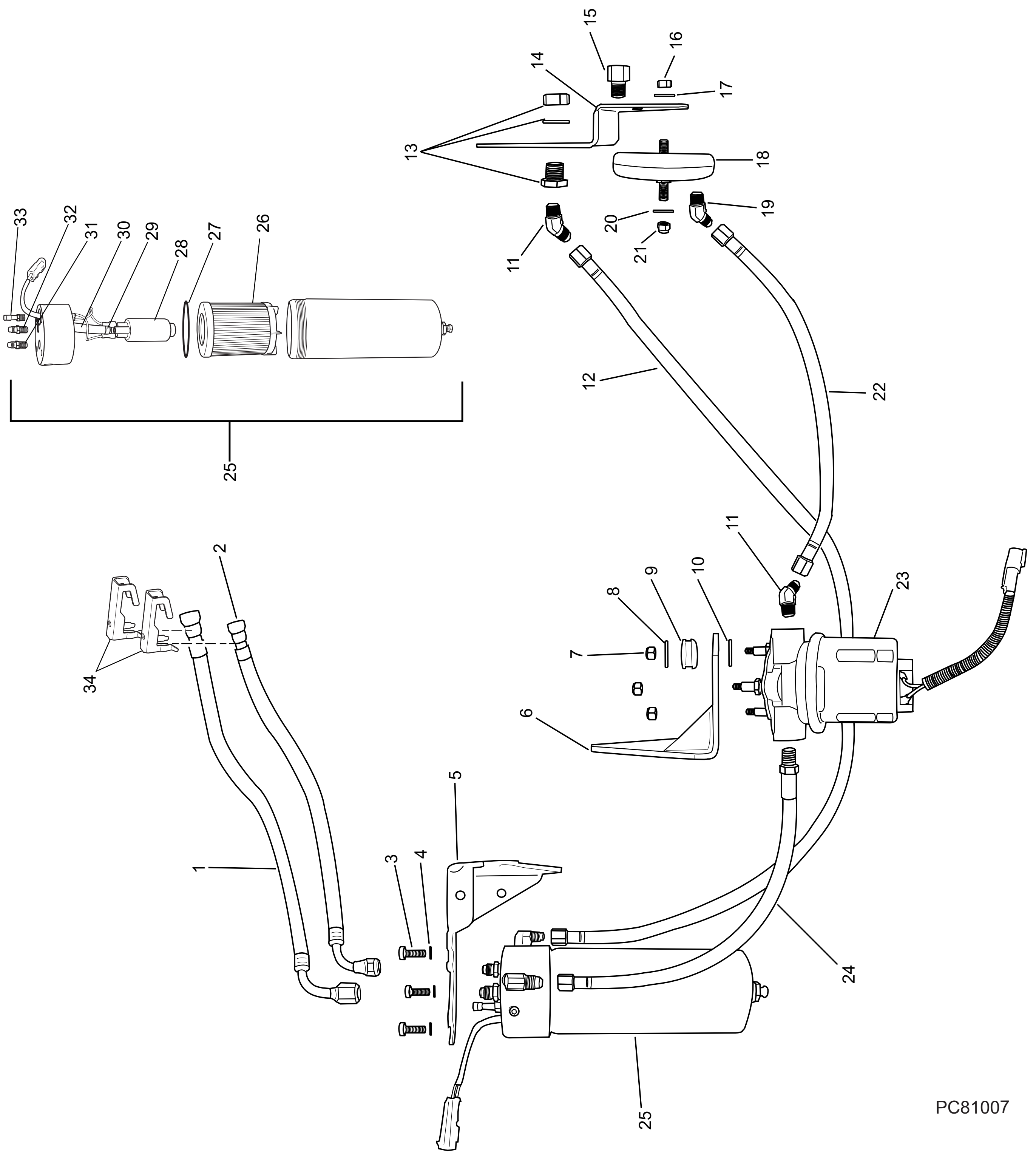
REMOTE OIL FILTER COMPONENTS (2005) - FIGURE 7



REMOTE OIL FILTER COMPONENTS (2005) - FIGURE 7

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R079066	**Oil Filter Header**	1
2	93930000	**Lockwasher**, header mounting bolt	3
3	99333020	**Bolt**, header mounting	3
4	R143175	**Decal**, “Caution Hot”	1
5	R047245	**O-Ring**, oil line	2
6	R024203	**Nipple**, header filter adapter	1
7	22679	**Filter**, oil	1
8	RA045155A	**Hose Assembly**, block to filter header	1
8	RA045120D	**Hose Assembly**, block to filter header (Returnless Fuel System)	1
9	RA045155A	**Hose Assembly**, cooler to filter header	1
9	RA045120D	**Hose Assembly**, cooler to filter header (Returnless Fuel System)	1
10	R090258	**Bracket**, heat exchanger	1
11	95011000	**Nut**, sender terminal	1
12	95300300	**Lockwasher**, sender terminal	1
13	92300200	**Washer**, sender terminal	1
14	R020001	**Sender**, oil pressure (SS)	1
14	727046	**Sender**, oil pressure (DS)	AR
15	R024145	**Tee**, sender attaching	1
16	R020015A	**Switch**, oil pressure (SS)	1
17	RS3677	**Adapter**, sender attaching tee	1
18	R079048	**Fitting**, oil bypass adapter	1
19	R079065	**Adapter**, oil bypass	1
20	R143135	**Decal**, oil bypass adapter	1
21	R024183	**Fitting**, straight	2
22	RA045121A	**Hose Assembly**, cooler to block	1
23	R147049	**Cooler Assembly**	1
24	R024184	**Fitting**, 90 degree	2
25	R090013A	**Bracket**, oil cooler mounting	1
26	RS0302	**Bolt,** oil cooler attaching	1
27	RS2180	**Lockwasher**, oil cooler attaching	1
28	RS2058	**Nut,** oil cooler attaching	1
29	R090010	**Clamp**, oil cooler mounting	1
30	RS0256	**Bolt**, oil cooler clamp	1
31	RS1028	**Nut,** oil cooler clamp	1
32	90318275	**Bolt,** oil cooler clamp to bracket attaching	1
33	9330000	**Lockwasher**, clamp to bracket attaching	1
34	95310300	**Nut,** oil cooler clamp to bracket attaching	1
35	R090304A	**Bracket**, oil cooler attaching (Rtrnlss fuel sys.)	1
35	R090233A	**Bracket**, oil cooler attaching (OEM specific)	1
36	98443025	**Bolt,** bracket attaching	1
37	93940000	**Lockwasher**, bracket attaching	1
38	R024183	**Fitting**, straight (Returnless Fuel System)	1

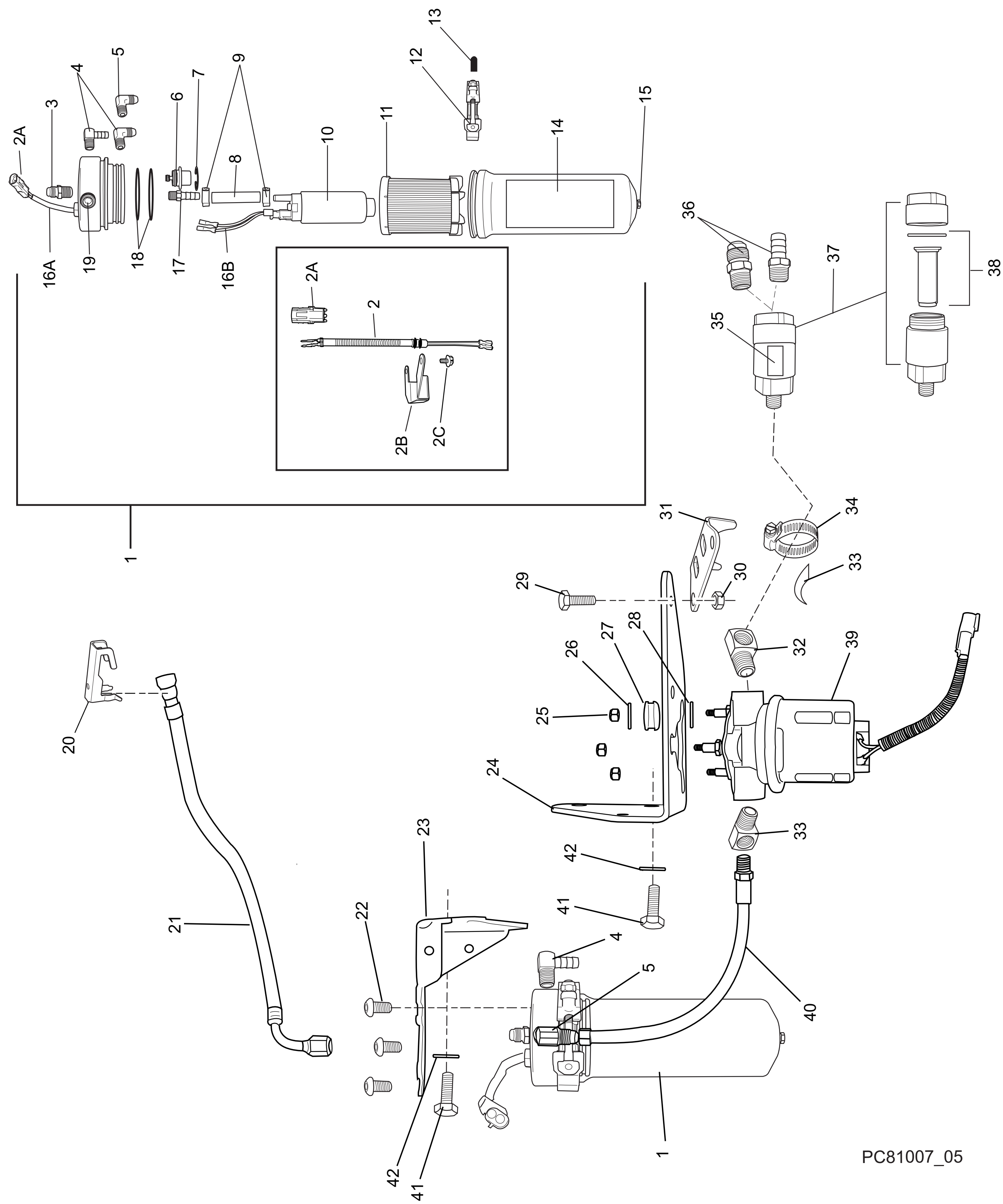
FUEL CONTROL CELL (FCC) COMPONENTS (2001-2004) - FIGURE 8



FUEL CONTROL CELL (FCC) COMPONENTS (2001-2004) - FIGURE 8

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RA085090	**Hose Assembly**, FCC to fuel rail (inlet)	1
2	RA085091	**Hose Assembly**, fuel rail to FCC (return)	1
3	RS0302	**Bolt**, FCC mounting	3
4	RS2180	**Lockwasher**, FCC mounting	3
5	R090227	**Bracket**, FCC mounting	1
6	R090228	**Bracket**, low-pressure fuel pump mounting	1
7	RS1521L	**Locking Nut**, fuel pump terminal	3
8	R096142	**Washer**, fuel pump mounting	3
9	R094035A	**Grommet**, mounting bracket	3
10	R096141	**Washer**, fuel pump mounting	3
11	R024197	**Fitting**, 45 degree	2
12	RA085071B	**Hose Assembly**, FCC to fuel return line adapter	1
13	R024062A	**Adapter**, fuel return line	1
14	R090234	**Bracket**, fuel filter mounting	1
15	R024196	**Fitting**, fuel inlet	1
16	RS1529	**Nut**, fuel filter mounting	1
17	RS2181	**Washer**, fuel filter mounting	1
18	RA077013	**Filter**, fuel (115 micron)	1
NI	R077013	**Filter**, screen (115 micron)	1
19	R024198	**Fitting**, 45 degree	1
20	RS2675	**Washer**	1
21	TBD	**Locking Nut**	1
22	RA085071	**Hose Assembly**, filter to low-pressure pump	1
23	RA080018	**Fuel Pump**, low-pressure	1
24	RA085070	**Hose Assembly**, low-pressure pump to FCC	1
25	RA080029	**Fuel Control Cell (FCC) Assembly**	1
26	RP080026	**Fuel Filter**, FCC Assembly	1
27	R047214	**O’Ring**, FCC seal	1
28	RA080027	**Fuel Pump**, high pressure	1
29	R127087	**Clamp**, Oetiker	2
30	R045098	**Hose**, 5/16 I.D. - 1/2 O.D.	1
31	R024175	**Fitting**, fuel line	1
32	R024163A	**Fitting**, fuel line	1
33	R035031	**Fitting**, fuel pressure, Schrader valve	1
34	R127100	**Retainer**, fuel line	2
NI	R034041	**Cap**, Schrader valve	1

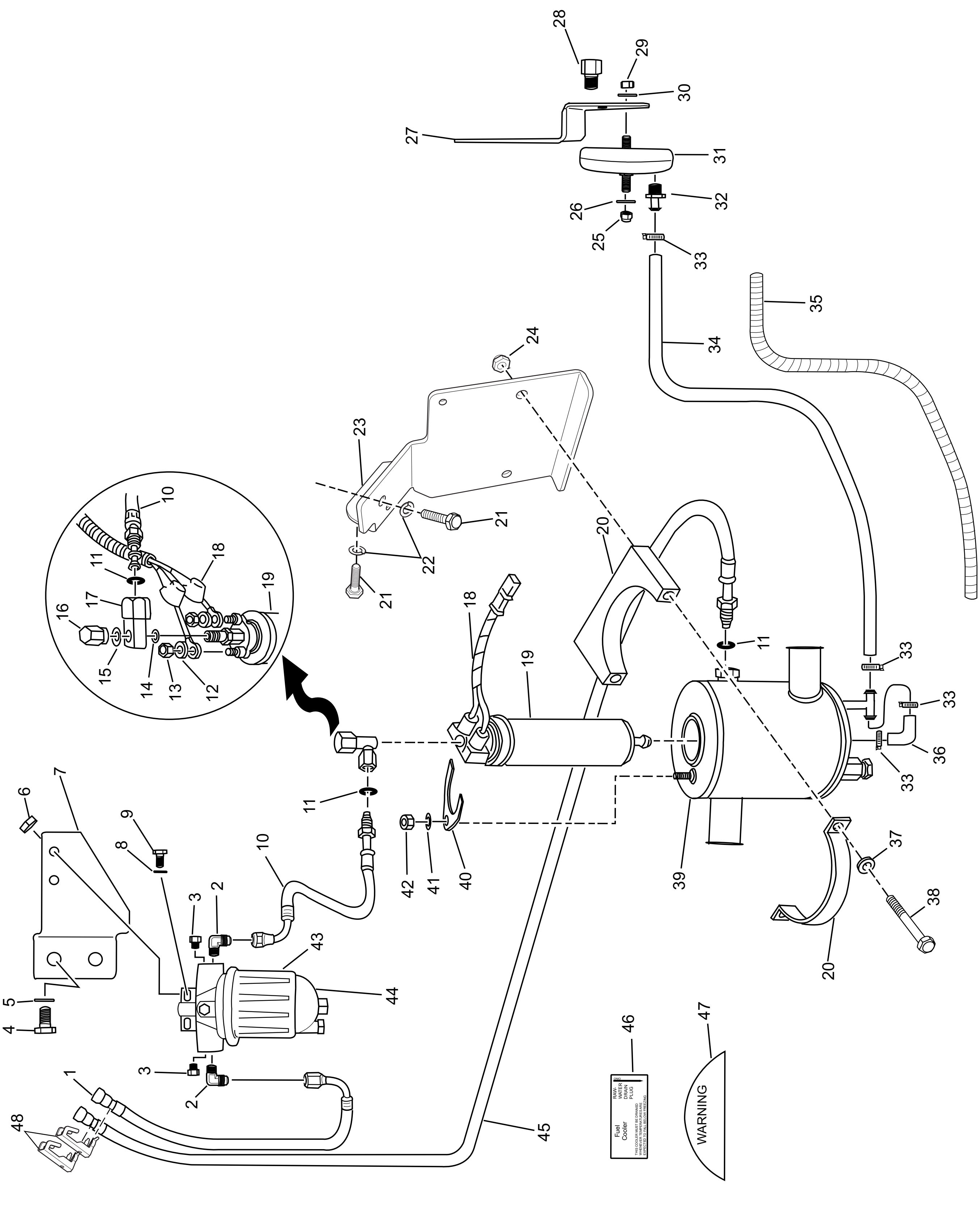
FUEL CONTROL CELL (FCC) COMPONENTS (2005)- FIGURE 9



FUEL CONTROL CELL (FCC) COMPONENTS (2005) - FIGURE 9

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RA080030A	**Fuel Control Cell Assembly**	1
2	R121085A	**Harness**, 1-piece, FCC pass through (1-piece harness **does not** retro fit for 2-piece harness)	1
2A	7172040	**Connector**, W/P 2-way Female	1
2B	R012030	**Baffle**, FCC used w/1-piece harness	1
2C	91620025	**Screw**, self tapping, baffle/1-piece harness retaining	2
3	R024175	**Fitting**, 1/4 NPT X SAE	1
4	R024225	**Fitting**, 1/4 NPT to Hose (return to tank)	1
4	R024224	**Fitting**, 1/4 NPT to SAE (return to tank)	AR
5	R024163	**Fitting**, 1/4 NPT X SAE (from LPFP)	1
6	R088004	**Regulator**, fuel pressure (FCC System Only)	1
7	R048070	**Retainer**, fuel pressure regulator	1
8	R045098B	**Hose**, 5/16id X 1/2od X 2 1/2	1
9	R127087	**Clamp**, Oetiker, 5/8	2
10	RA080027	**Pump**, high pressure fuel	1
11	R080026	**Filter**, fuel (FCC)	1
NI	RP080026	**Kit**, FCC filter and O-rings	1
12	R171010	**Clamp**, FCC	1
13	R128002	**Cover**, T-bolt end	1
14	R143112A	**Decal**, FCC	1
15	RS3554	**Plug**, pipe, hex head, 1/8	1
16A	RA121060	**Harness**, FCC Feed through	1
16B	RA121061A	**Harness**, FCC internal	1
17	R024219	**Fitting**, 1/8 NPT X 5/16 Barb	1
18	R047241	**O-Ring**, FCC sealing	1
19	RS3550	**Plug**, pipe, hex socket, 1/4	1
20	R127100	**Retainer**, fuel line	1
21	RA085090	**Hose Assembly**, FCC to fuel rail (inlet)	1
22	90384075	**Bolt**, FCC attaching	3
23	R090227	**Bracket**, FCC mounting	1
24	R090228A	**Bracket**, low-pressure fuel pump mounting	1
25	RS1521L	**Locking Nut**, low-pressure fuel pump	3
26	R096142	**Washer**, flat, mounting, upper	3
27	R094035A	**Grommet**, isolator	3
28	R096141	**Washer**, fuel pump mounting, lower	3
29	RS0251	**Bolt**, pre-filter bracket attaching	2
30	RS1078	**Nut**, w/lockwasher, pre-filter bracket attaching	2
31	R090272	**Bracket**, pre-filter mounting	1
32	R024192	**Fitting**, 90 degree, LPFP	2
33	R094040	**Isolator**, rubber, w/ adhesive	1
34	RS3858	**Clamp**, pre-filter 1 ¼”	1
35	R143174	**Decal**, pre-filter	1
36	30603	**Fitting**, fuel inlet, pre-filter, 3/8 NPT X 1/2 SAE	AR
36	R024218	**Fitting**, fuel inlet, pre-filter, 3/8 NPT X 1/2 hose barb	1
37	RA077014	**Fuel Pre-filter Assembly, 150 micron**	1
38	RP077014	**Kit,** fuel filter and seal	1
39	RA080018	**Fuel Pump**, low-pressure	1
40	RA085070	**Hose Assembly**, low-pressure pump to FCC	1
41	98443025	**Bolt**, FCC/LPFP bracket attaching, block	4
42	93940000	**Lockwasher**, FCC/LPFP bracket attaching, block	4
NI	R143114	**Decal**, Warning, fuel leaks	1

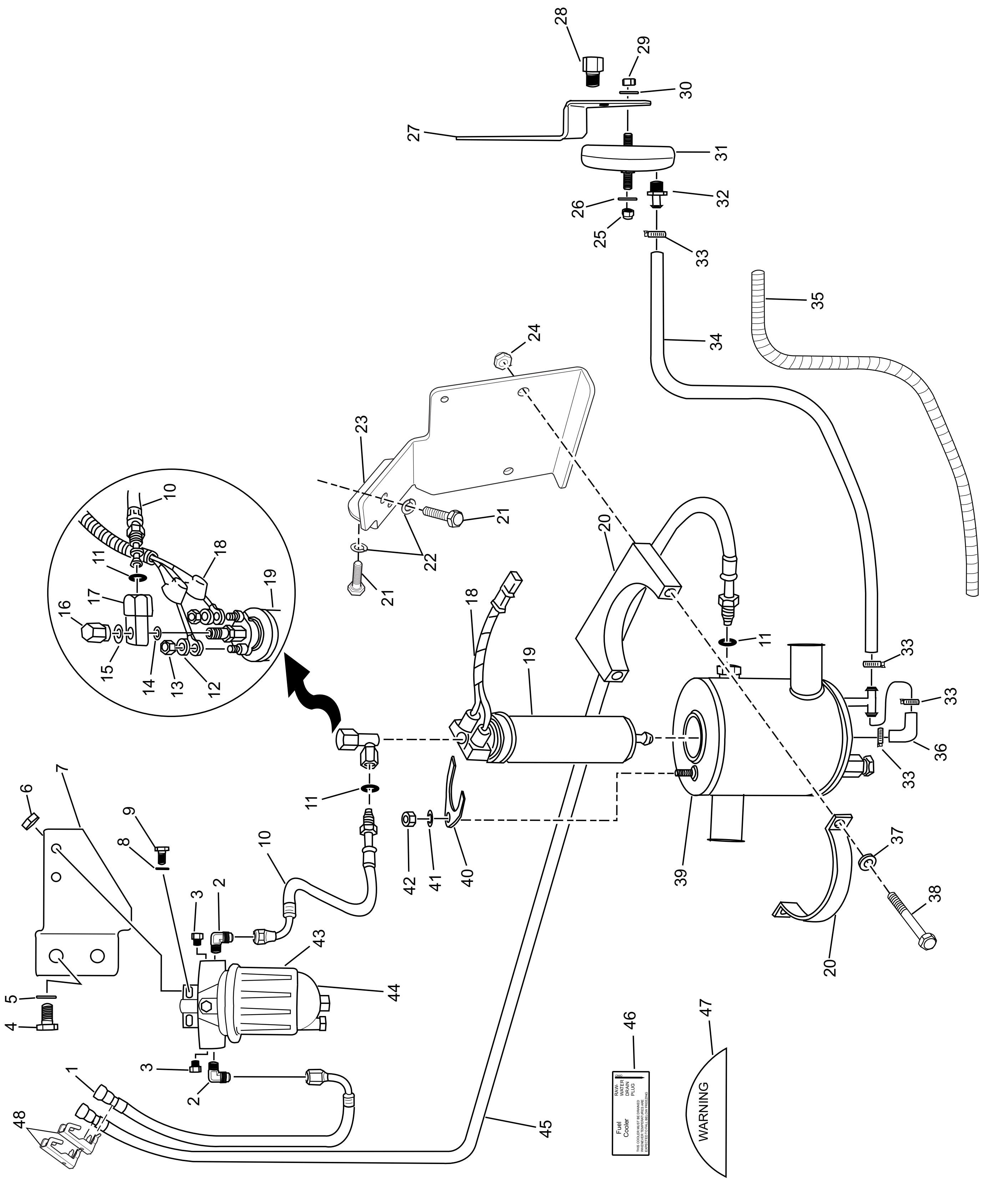
OLD RETURNLESS FUEL SYSTEM COMPONENTS - FIGURE 10 (thru S/N 630206)



OLD RETURNLESS FUEL SYSTEM COMPONENTS - FIGURE 10 (thru S/N 630206)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RA085090	**Fuel Line Assembly**, filter to fuel rail	1
2	R024163	**Fitting**, 90 degree	2
3	RS3552	**Fitting**, blockoff	2
4	98443025	**Bolt**, filter bracket mounting	2
5	93940000	**Lockwasher**, mounting bolt	2
6	RS2060	**Nut**, mounting bolt	2
7	R090237	**Bracket**, filter mounting	1
8	92200000	**Washer**, mounting bolt	2
9	RS0282	**Bolt**, filter mounting	2
10	RA085092	**Fuel Line Assembly**, fuel pump to filter	1
11	22800	**O-Ring**, fuel line assembly	2
12	NSS	**Lockwasher**, retaining nut	2
13	NSS	**Nut**, wire retaining	2
14	23516	**O-Ring**, fuel pump sealing (large)	1
15	23515	**O-Ring**, fuel pump sealing (small)	1
16	98442	**Nut**, fitting to fuel pump	1
17	98440	**Fitting**, fuel line to fuel pump	1
18	49038	**Wire Harness**, fuel pump to engine harness	1
19	47039	**Electric Fuel Pump Assembly**	1
20	23554	**Retainer**, fuel cooler rubber	1
21	98443025	**Bolt**, fuel cooler mounting bracket	2
22	93940000	**Lockwasher**, mounting bolt	2
23	R090238	**Bracket**, fuel cooler mounting	1
24	95310300	**Locking Nut**, fuel cooler mounting	2
25	NSS	**Locking Nut**, fuel filter	1
26	RS2675	**Washer**, fuel filter	1
27	R090234	**Bracket**, fuel filter mounting	1
28	R024196	**Fitting**, fuel inlet	1
29	RS1529	**Nut**, fuel filter mounting	1
30	RS2181	**Washer**, fuel filter mounting	1
31	RA077013	**Filter**, fuel (115 micron)	1
32	30636	**Fitting**, fuel outlet	1
33	RS3864	**Clamp**, fuel line	2
34	98431	**Fuel Line Assembly**, filter to fuel pump	1
35	47064	**Conduit**, protective	1
36	49041	**Fuel Line Assembly**, 90 degree elbow	1

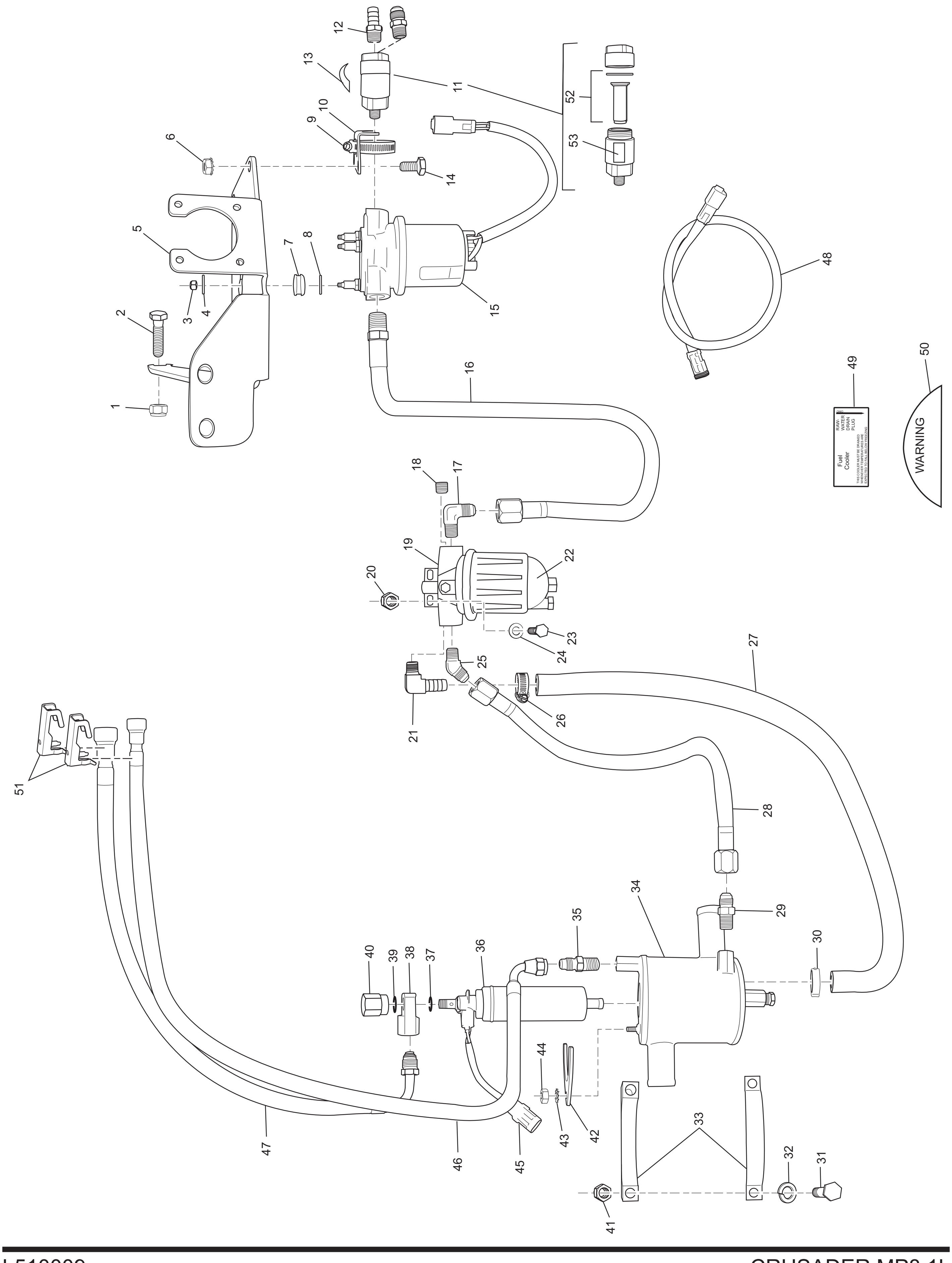
OLD RETURNLESS FUEL SYSTEM COMPONENTS - FIGURE 10 (cont'd) (thru S/N 630206)



OLD RETURNLESS FUEL SYSTEM COMPONENTS - FIGURE 10 (cont'd) (thru S/N 630206)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
37	RS2180	**Lockwasher**, mounting bolt	2
38	90318325	**Bolt**, fuel cooler mounting	2
39	R147041	**Fuel Cooler Assembly**	1
40	98642	**Retainer**, fuel pump	1
41	NSS	**Star washer**, retaining nut	1
42	RS1078	**Nut**, w/lockwasher fuel pump retainer attaching (RS1078 replaces items 41 and 42)	1
43	47046	**Fuel Filter**, Racor water separating	1
44	47047	**Element**, Racor fuel filter (not shown)	1
45	RA085093	**Fuel Line Assembly**, fuel rail to fuel cooler	1
46	23645	**Decal**, fuel cooler system warning	1
47	23649	**Decal**, fuel system warning	1
48	R127100	**Retainer**, fuel line	2

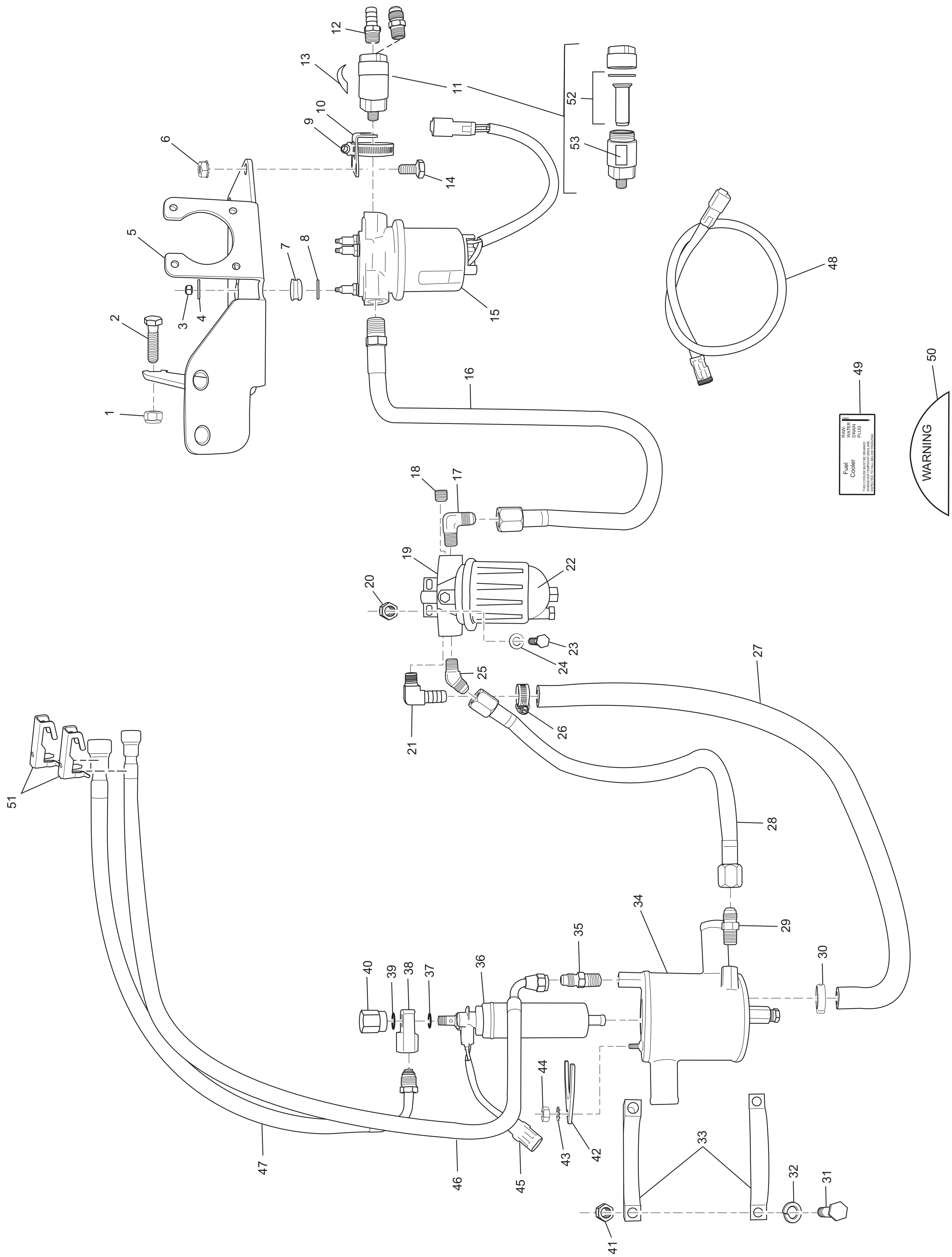
NEW RETURNLESS FUEL SYSTEM COMPONENTS - FIGURE 11 (S/N 630207 thru present)



NEW RETURNLESS FUEL SYSTEM COMPONENTS - FIGURE 11 (S/N 630207 thru present)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
*	RF201007	**Kit**, retrofit	AR
1	RS2060	**Nut**, locking	1
2	90205125	**Bolt**, bracket mounting	1
3	RS1521L	**Nut**, locking	3
4	R096142	**Flatwasher**, mounting	3
5	R090270	**Bracket**, L.P. pump/Racor water separating	1
6	RS1078	**Nut**, pre-filter bracket mounting	2
7	R094035A	**Grommet**, rubber	3
8	R096141	**Flatwasher**, mounting	3
9	RS3858	**Clamp**, pre-filter mounting	1
10	R090272	**Bracket**, pre-filter mounting	1
11	RA077014	**Filter**, fuel	1
12	R024218	**Fitting**, fuel inlet, hose	1
12	30603	**Fitting**, fuel inlet, SAE	AR
13	R094040	**Adhesive**, rubber strip	1
14	RS0251	**Bolt**, pre-filter bracket mounting	2
15	RA080018	**Fuel Pump**, low-pressure	1
16	RA085070	**Fuel Line Assembly**, L.P. fuel pump to Racor filter	1
17	R024163	**Fitting**, 90 degree	1
18	RS3550	**Fitting**, blockoff	1
19	47046	**Fuel Filter**, Racor water separating	1
20	RS2060	**Nut**, Racor filter locking	2
21	R024207	**Fitting**, 90 degree	1
22	47047	**Element**, Racor fuel filter (not shown)	1
23	RS0282	**Bolt**, Racor filter mounting	2
24	92200000	**Flatwasher**, Racor filter mounting	2
25	R024197	**Fitting**, 45 degree	1
26	RS3864	**Clamp**,	1
27	98431	**Fuel Line Assembly**, Racor filter to high pressure fuel pump	1
NI	47064	**Conduit**, protective (not shown)	1
28	RA085071	**Fuel Line Assembly**, fuel cooler to Racor filter	1
29	R024163A	**Fitting**, cooler to hose assembly	1
30	R127087E	**Clamp**, crimp	1
31	90318325	**Bolt**, fuel cooler mounting	2
32	RS2180	**Lockwasher**, fuel cooler mounting	2
33	23554	**Retainer**, fuel cooler mounting	1

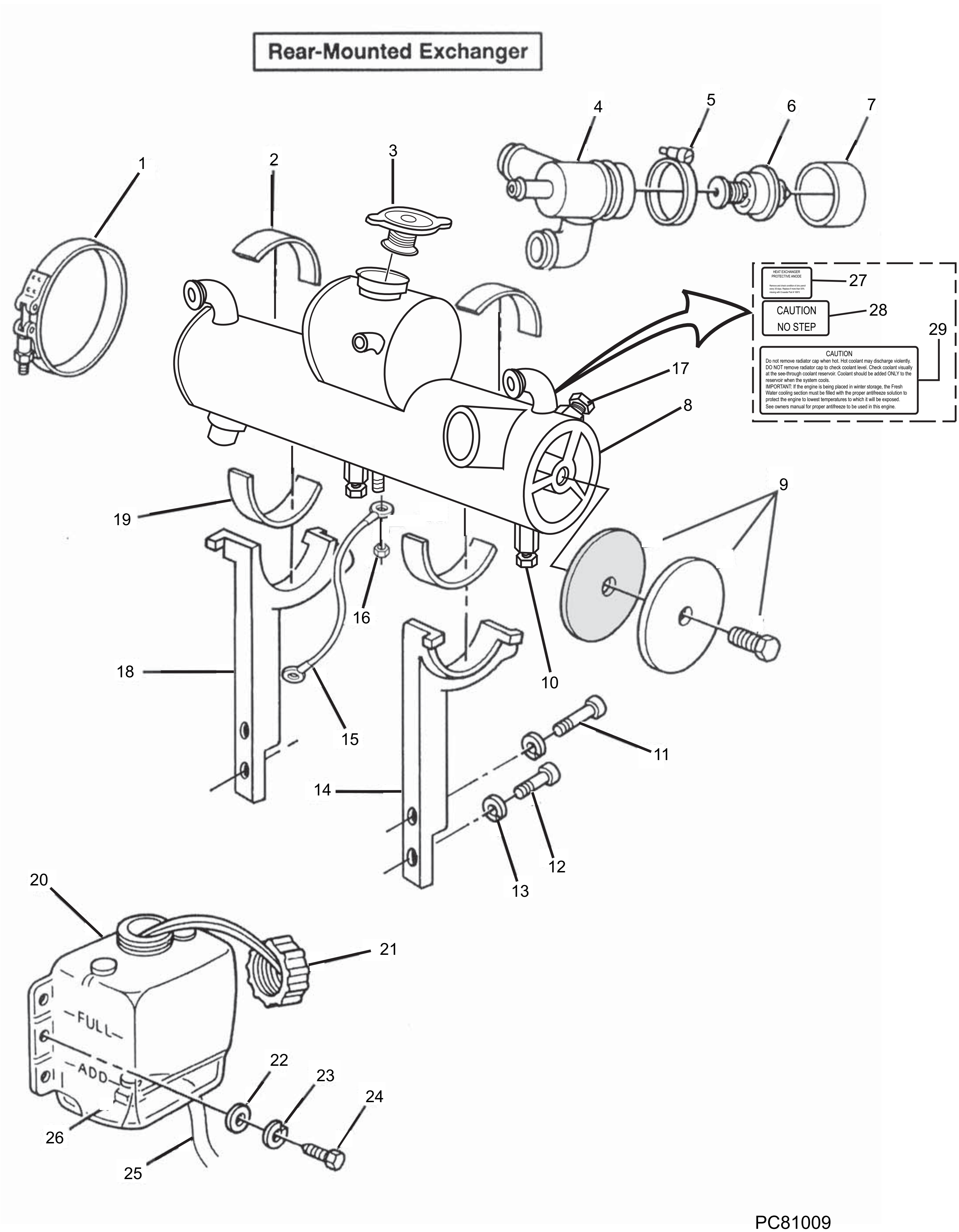
NEW RETURNLESS FUEL SYSTEM COMPONENTS - FIGURE 11 (cont'd) (S/N 630207 thru present)



NEW RETURNLESS FUEL SYSTEM COMPONENTS - FIGURE 11 (cont'd) (S/N 630207 thru present)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
34	RA147041A	**Fuel Cooler Assembly**	1
35	R024175	**Fitting**, hose assembly to cooler	1
36	47039	**Electric Fuel Pump Assembly**	1
37	23515	**O-ring**, fuel fitting sealing	1
38	98440	**Fitting**, fuel line to fuel pump	1
39	23516	**O-ring**, fuel fitting sealing	1
40	98442	**Nut**, fitting to fuel pump	1
41	95310300	**Locking Nut**, fuel cooler mounting	2
42	98642	**Retainer**, fuel pump	1
43	NSS	**Star washer**, retaining nut	1
44	RS1078	**Nut**, w/lockwasher fuel pump retainer attaching (RS1078 replaces items 43 and 44)	1
45	49038	**Harness**, fuel pump	1
46	RA085091A	**Fuel Line Assembly**, fuel rail to fuel cooler	1
47	RA085098	**Fuel Line Assembly**, fuel pump to fuel rail	1
48	R121077	**Jumper Harness**, low-pressure fuel pump	1
49	23645	**Decal**, fuel cooler system warning	1
50	23649	**Decal**, fuel system warning	1
51	R127100	**Retainer**, fuel line	2
52	RP077014	**Kit**, service, fuel pre-filter	AR
53	R143174	**Decal**, fuel pre-filter	1

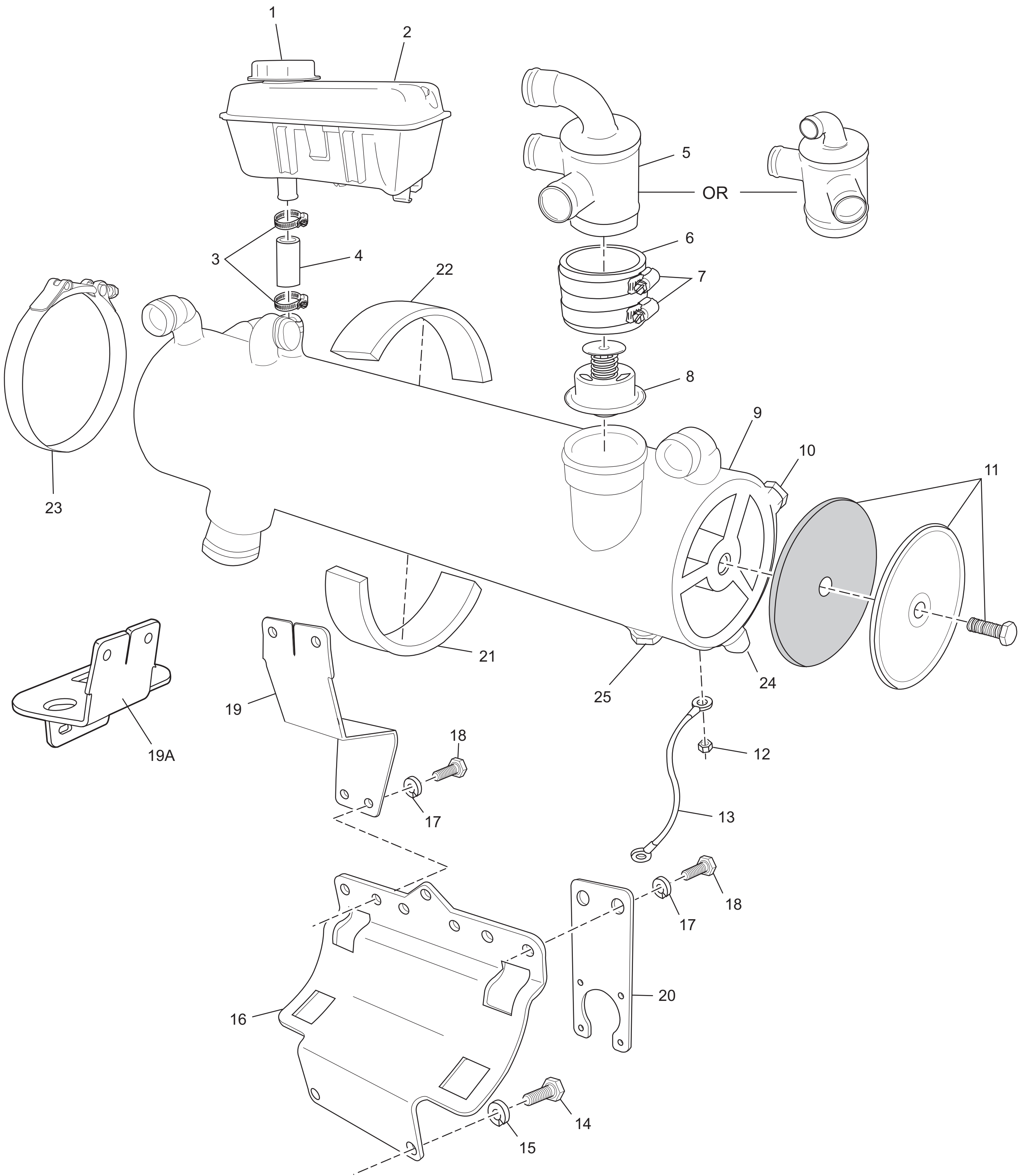
HEAT EXCHANGER and COMPONENTS (2001-2004) - FIGURE 12



HEAT EXCHANGER and COMPONENTS (2001-2004) - FIGURE 12

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R171009	**Clamp**, exchanger mounting	2
2	R094041	**Isolator**, top	2
3	R034006A	**Pressure Cap (7 lb)**, exchanger	1
4	R025027	**Thermostat Housing**	1
5	RS3860	**Clamp**, thermostat housing (#36)	2
6	R026007	**Thermostat** (170 degree)	1
7	98204	**Hose**, thermostat housing attaching	1
8	RA147039	**Heat Exchanger Assembly**	1
9	23540	**End Cap Kit**, exchanger	AR
10	RS3552	**Plug**, drain (1/4”)	1
11	90368175	**Bolt**, support attaching (1 3/4”)	2
12	90368100	**Bolt**, support attaching (1”)	2
13	RS2180	**Lockwasher**, support attaching bolt	4
14	R090254	**Support**, exchanger (port)	1
15	R101013	**Wire**, grounding	1
16	RS1078	**Nut**, ground wire stud	1
17	R168008	**Zinc**, sacrificial	1
18	R090225	**Support**, exchanger (starboard)	1
19	R094040	**Isolator**, bottom	2
20	R146002	**Bottle**, coolant overflow	1
21	23527	**Cap**, coolant fill	1
22	92200000	**Washer**, mounting bolt	2
23	RS2179	**Lockwasher**, mounting bolt	2
24	RS0280	**Bolt**, coolant overflow mounting (3/4”)	2
25	R045139	**Tube**, overflow (48”)	1
26	R127084	**Clamp**, overflow tube	2
27	23627	**Decal**, exchanger	1
28	22847	**Decal**, exchanger	1
29	23657	**Decal**, exchanger	1

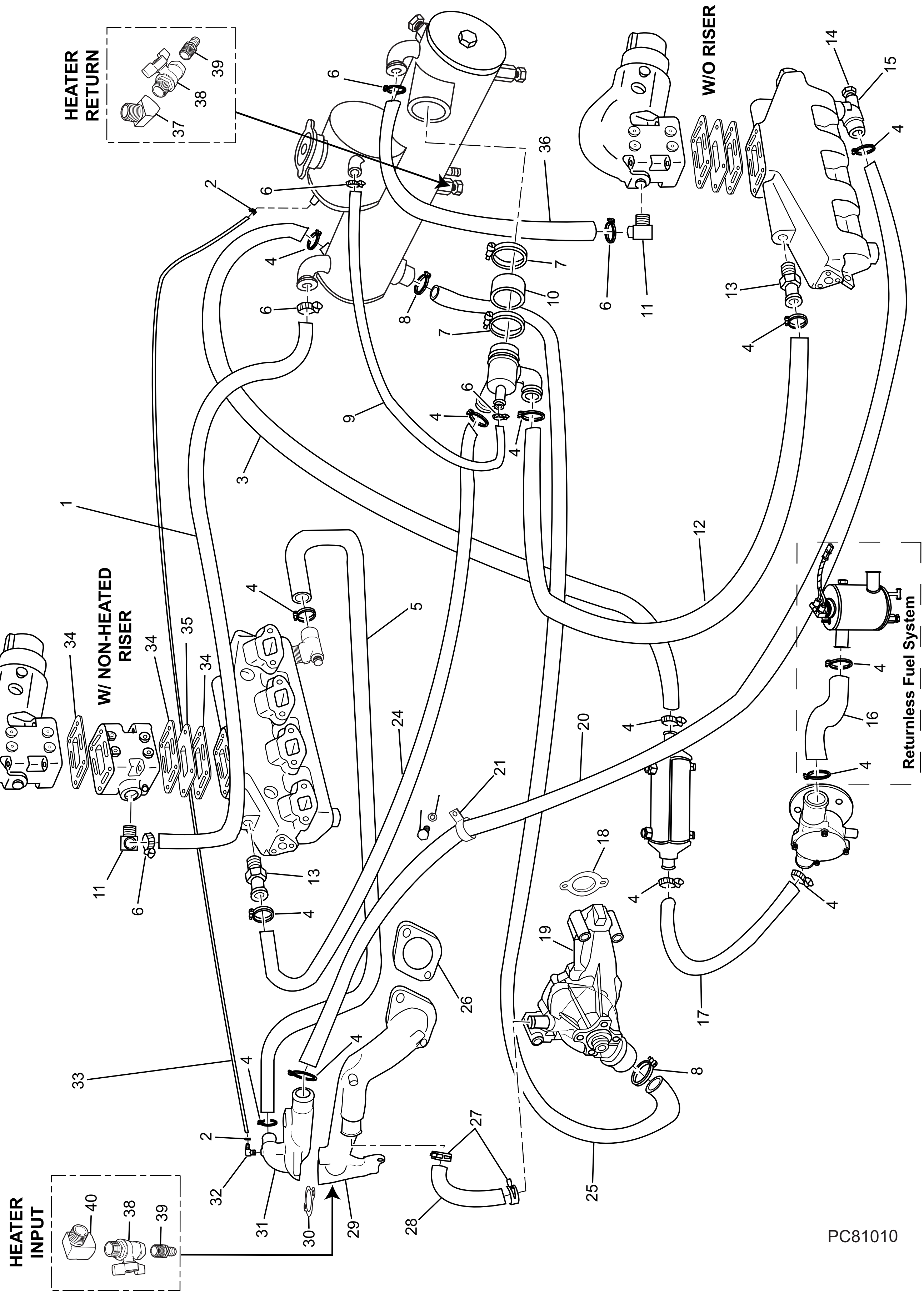
HEAT EXCHANGER and COMPONENTS (2005) - FIGURE 13



HEAT EXCHANGER and COMPONENTS (2005) - FIGURE 13

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R034045	**Cap**, degas bottle	1
2	R146001	**Bottle**, degas	1
NI	R143172	**Decal**, spec, 8.1 STD, FCC	AR
NI	R143172A	**Decal**, spec, 8.1 STD, returnless fuel sys.	AR
NI	R143173	**Decal**, spec, 8.1 HO, FCC	AR
NI	R143173A	**Decal**, spec, 8.1 HO, returnless fuel sys.	AR
NI	R143153	**Decal**, coolant fill	1
3	RS3854	**Clamp**, hose	2
4	R045153	**Hose**, degas bottle to heat exchanger	1
4	R045161	**Hose**, degas bottle to heat exchanger (vdrv)	1
5	R025027A	**Thermostat Housing**	1
5	R025027B	**Thermostat Housing** (vdrv, OEM specific)	1
6	R045162	**Hose**, thermostat housing attaching	1
7	RS3860	**Clamp**, thermostat housing (#36)	2
8	R026007	**Thermostat** (170 degree)	1
9	RA147039B	**Heat Exchanger Assembly**	1
10	R168005	**Zinc**, sacrificial	1
11	23540	**End Cap Kit**, exchanger	AR
12	RS1078	**Nut**, ground wire stud	1
13	R101013	**Wire**, grounding	1
14	RS0304	**Bolt**, heat exchanger bracket attaching	2
15	RS2180	**Lockwasher**, heat exchanger brkt attaching	2
16	R090258	**Bracket**, heat exchanger	1
17	RS2179	**Lockwasher**, bracket attaching	4
18	98333020	**Bolt**, bracket attaching	4
19	R090311	**Bracket**, degas bottle	1
19A	R090322	**Bracket**, degas bottle (vdrv, OEM specific)	1
20	R090291	**Bracket**, 10-pin connector	1
21	R094040	**Isolator**, bottom	2
22	R094041	**Isolator**, top	2
23	R171009	**Clamp**, exchanger mounting	2
24	RS3552	**Plug**, raw water drain (1/4”)	1
25	RS3557	**Plug**, fresh water drain (3/8”)	1
NI	23627	**Decal**, Anode	1
NI	22847	**Decal**, Caution No Step	1
NI	23657	**Decal**, heat exchanger	1
NI	R143156	**Decal**, raw water drain	1
NI	R143257	**Decal**, fresh water drain	1
NI	R143158	**Decal**, “Ultra Low Emissions”	1
NI	R143160	**Decal**, Emissions MY ‘03	1
NI	R143160-04	**Decal**, Emissions MY ‘04	1
NI	R143160-05	**Decal**, Emissions MY ‘05	1

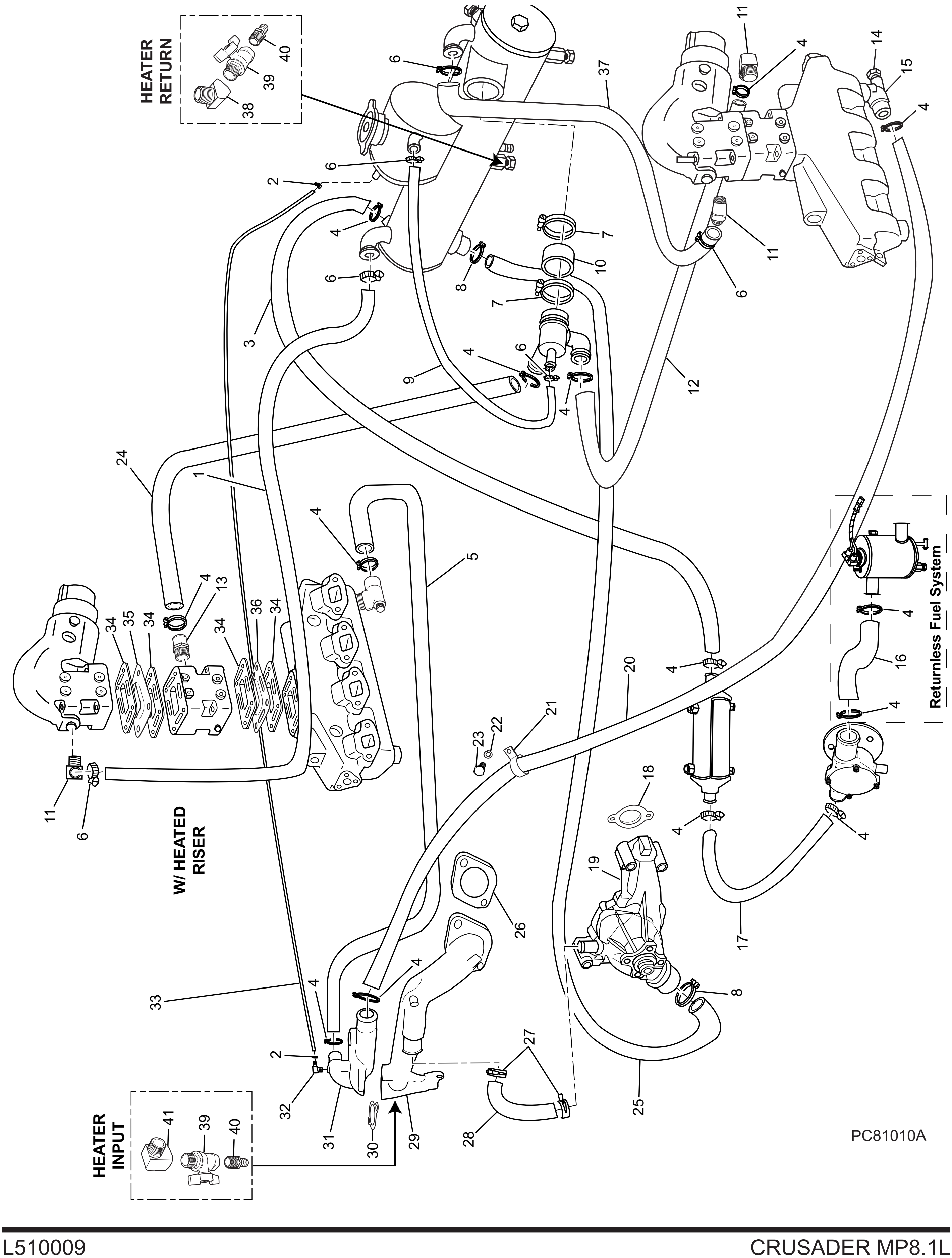
FRESH WATER COOLING SYSTEM COMPONENTS (NON-HEATED RISERS) - FIGURE 14



FRESH WATER COOLING SYSTEM COMPONENTS (NON-HEATED RISERS) - FIGURE 14

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R045124	**Hose**, exchanger to exhaust elbow (Port STD)	1
1	R045125	**Hose**, exchanger to exhaust elbow (Starboard STD)	1
2	RS3870	**Clamp**, hose	2
3	R045123	**Hose**, oil cooler to exchanger	1
4	RS3858	**Clamp**, hose (#20)	14
5	R045127	**Hose**, fill riser to exhaust manifold (Starboard)	1
6	RS3851	**Clamp**, hose (#16)	6
7	RS3860	**Clamp**, thermostat housing (#36)	2
8	RS3855	**Clamp**, hose (#32)	2
9	20806	**Hose**, bypass - thermostat housing to expansion tank	1
10	98204	**Hose**, thermostat housing attaching	1
11	R024006A	**Fitting**, 90 degree	2
12	18307	**Hose**, thermostat housing to exhaust manifold (LH)	1
13	97852	**Fitting**, exhaust elbow (1” hose)	2
14	RS3554	**Plug**, drain	2
15	30624	**Fitting**, exhaust manifold (90 degree)	2
16	R045129	**Hose**, raw water pump to fuel cooler assembly (returnless fuel system only)	1
17	R045122	**Hose**, raw water pump to oil cooler	1
18	RM0266	**Gasket**, water pump to engine block	2
19	RA057030	**Water Pump Assembly**	1
20	R045128	**Hose**, fill riser to exhaust manifold (Port)	1
21	R090082	**Clamp**, strap	1
22	93920000	**Lockwasher**, strap clamp attaching	1
23	98223016	**Bolt**, strap clamp attaching	1
24	18308	**Hose**, thermostat housing to exhaust manifold (RH)	1
25	R045126	**Hose**, circulation pump to exchanger	1
26	RM0268	**Gasket**, water crossover	1
27	RS3864	**Clamp**, hose	2
28	R045116A	**Hose**, circulation pump to water crossover	1
29	R025034	**Water Crossover**	1
30	RM0121	**Gasket**, distribution housing to water crossover	1
31	R025030	**Housing**, coolant distribution	1
32	R024055	**Fitting**, fill riser (90 degree)	1
33	R045132	**Hose**, fill riser to expansion tank	1
34	98127	**Gasket**, elbow to riser / elbow to manifold / riser to manifold	6
35	98124	**Plate**, blockoff	2
36	R045124A	**Hose**, exchanger to exhaust elbow (Port “V”-Drive)	1
36	R045124	**Hose**, exchanger to exhaust elbow (Port STD)	1
37	R024209	**Fitting**, 45°, heater applications	1
38	R035039	**Valve**, ball, heater applications	2
39	30645	**Fitting**, 5/8” nipple, heater applications	2
40	R024139	**Fitting**, 90°, heater applications	1

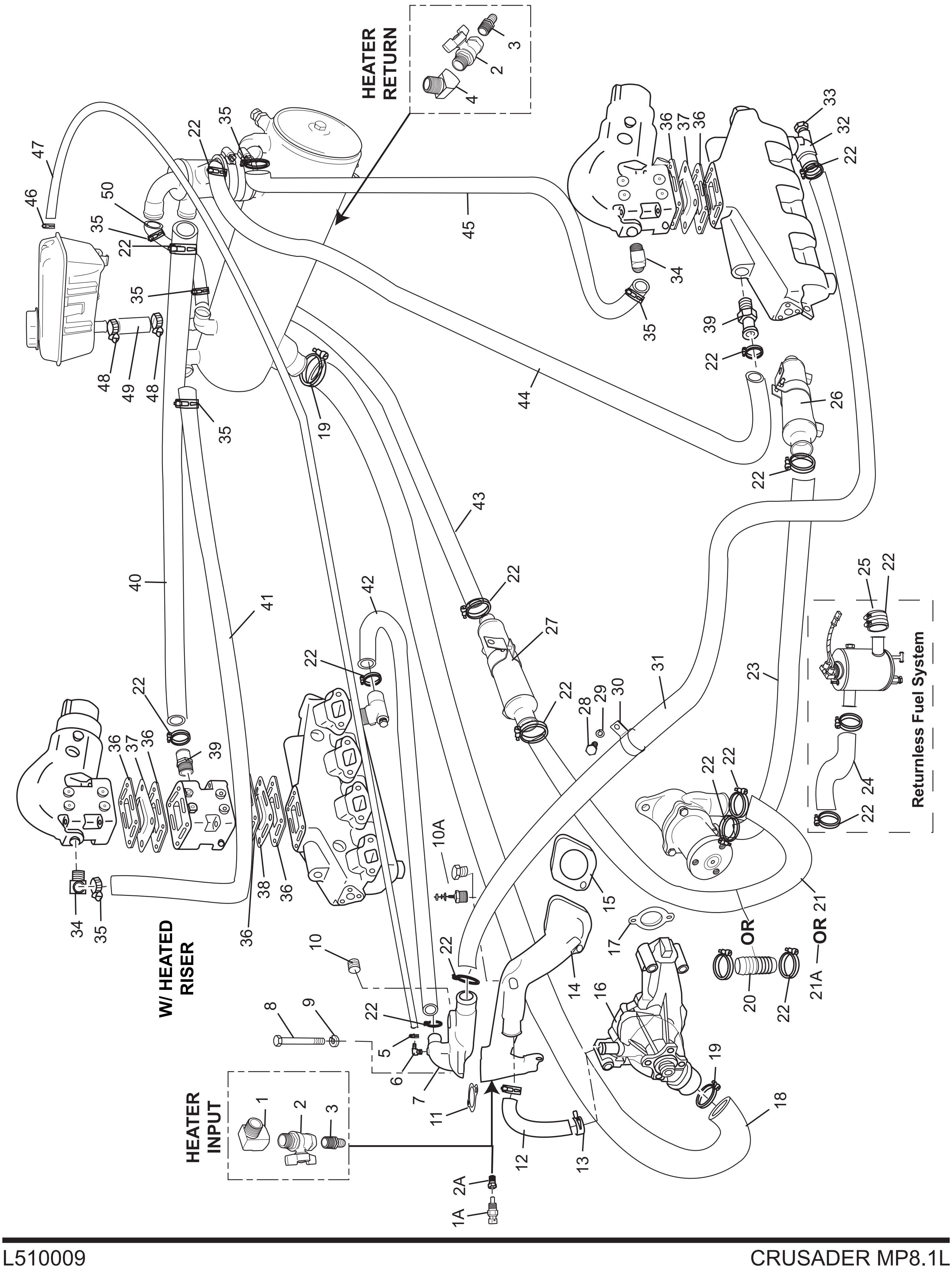
FRESH WATER COOLING SYSTEM COMPONENTS (HEATED RISERS) - FIGURE 15



FRESH WATER COOLING SYSTEM COMPONENTS (HEATED RISERS) - FIGURE 15

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R045125A	**Hose**, exchanger to exhaust elbow (Starboard "V"-Drive)	1
1	R045125	**Hose**, exchanger to exhaust elbow (Starboard STD)	1
2	RS3870	**Clamp**, hose	2
3	R045123	**Hose**, oil cooler to exchanger	1
4	RS3858	**Clamp**, hose (#20)	14
5	R045127	**Hose**, fill riser to exhaust manifold (Starboard)	1
6	RS3851	**Clamp**, hose (#16)	6
7	RS3860	**Clamp**, thermostat housing (#36)	2
8	RS3855	**Clamp**, hose (#32)	2
9	20806	**Hose**, bypass - thermostat housing to expansion tank	1
10	98204	**Hose**, thermostat housing attaching	1
11	R024006A	**Fitting**, 90 degree	3
12	R045136	**Hose**, thermostat housing to exhaust manifold (LH)	1
13	97852	**Fitting**, exhaust elbow (1" hose)	1
14	RS3554	**Plug**, drain	2
15	30624	**Fitting**, exhaust manifold (90 degree)	2
16	R045129	**Hose**, raw water pump to fuel cooler assembly (returnless fuel system only)	1
17	R045122	**Hose**, raw water pump to oil cooler	1
18	RM0266	**Gasket**, water pump to engine block	2
19	RA057030	**Water Pump Assembly**	1
20	R045128	**Hose**, fill riser to exhaust manifold (Port)	1
21	R090082	**Clamp**, strap	1
22	93920000	**Lockwasher**, strap clamp attaching	1
23	98223016	**Bolt**, strap clamp attaching	1
24	18414	**Hose**, thermostat housing to exhaust manifold (RH)	1
25	R045126	**Hose**, circulation pump to exchanger	1
26	RM0268	**Gasket**, water crossover	1
27	RS3864	**Clamp**, hose	2
28	R045116A	**Hose**, circulation pump to water crossover	1
29	R025034	**Water Crossover**	1
30	RM0121	**Gasket**, distribution housing to water crossover	1
31	R025030	**Housing**, coolant distribution	1
32	R024055	**Fitting**, fill riser (90 degree)	1
33	R045132	**Hose**, fill riser to expansion tank	1
34	98127	**Gasket**, elbow to riser / elbow to manifold / riser to manifold	8
35	98124	**Wing Plate**, blockoff	2
36	98124A	**Wing Plate**, pass thru	2
37	R045124A	**Hose**, exchanger to exhaust elbow (Port "V"-Drive)	1
37	R045124	**Hose**, exchanger to exhaust elbow (Port STD)	1
38	R024209	**Fitting**, 45°, heater applications	1
39	R035039	**Valve**, ball, heater applications	2
40	30645	**Fitting**, 5/8" nipple, heater applications	2
41	R024139	**Fitting**, 90°, heater applications	1

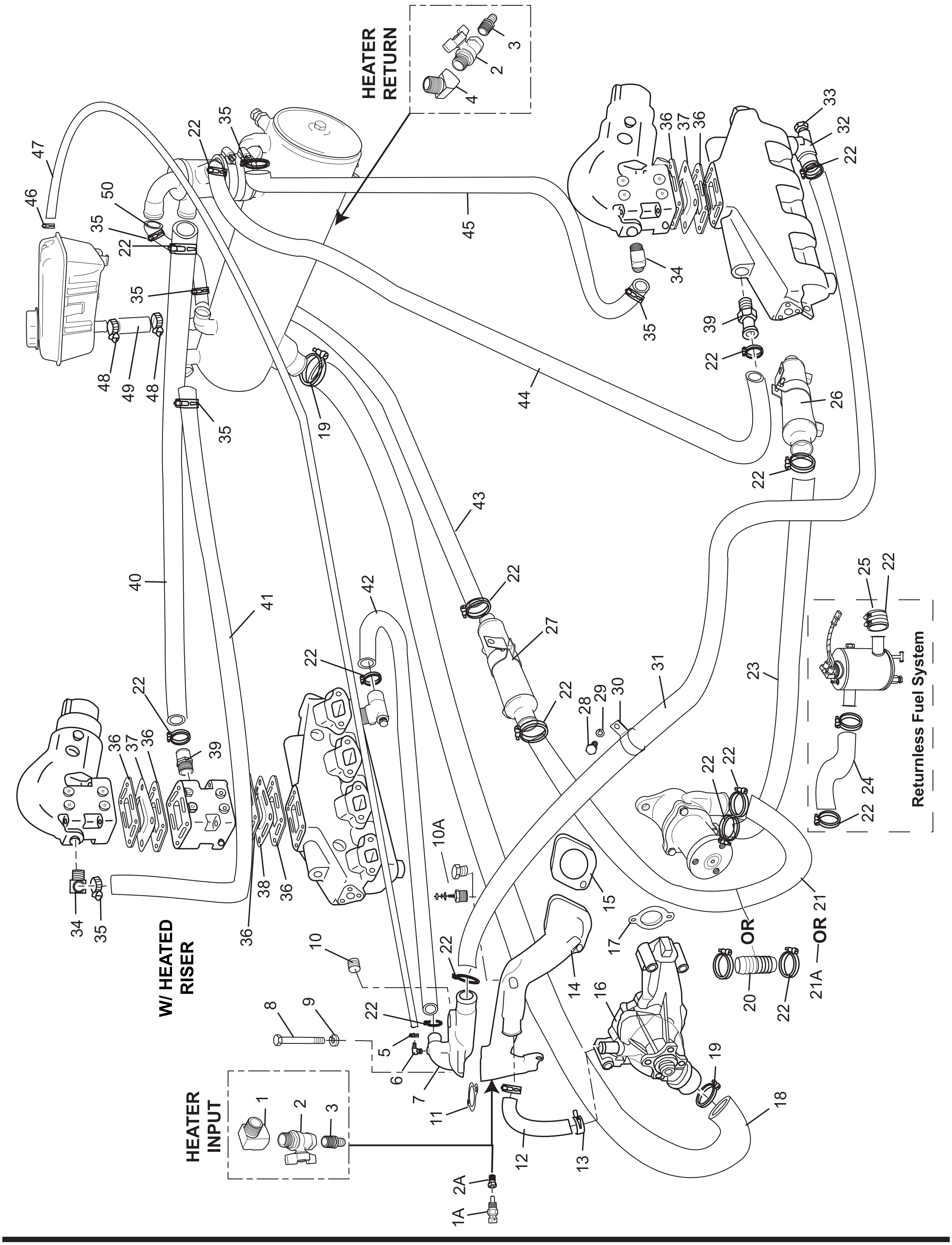
FRESH WATER COOLING SYSTEM COMPONENTS (2005) - FIGURE 16



FRESH WATER COOLING SYSTEM COMPONENTS (2005) - FIGURE 16

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R024209	**Fitting**, 45°, heater applications	1
1A	R020019	**Sensor**,Engine Coolant Temperature	1
2	R035039	**Valve**, ball, heater applications	2
2A	RS3681	**Bushing**, 1/2 NPT X 3/8 NPT	1
3	30645	**Fitting**, 5/8” nipple, heater applications	2
4	R024139	**Fitting**, 90°, heater applications	1
5	RS3870	**Clamp**, hose (#04)	1
6	R024055	**Fitting**, fill riser (90 degree)	1
7	R025030	**Housing**, coolant distribution	1
8	98443045	**Bolt**, distribution housing attaching	2
9	93940000	**Lockwasher**, distribution housing attaching	2
10	RS3551	**Plug**, distribution housing	1
10	R020019	**Sensor**, Engine Coolant Temperature (heater applications)	AR
10A	R020003	**Sender**, temperature (SS)	1
10A	727046	**Sender**, temperature (DS)	AR
10A	RS3557	**Plug**, water crossover	AR
11	RM0121	**Gasket**, distribution housing to water crossover	1
12	R045116A	**Hose**, circulation pump to water crossover	1
13	RS3864	**Clamp**, hose	2
14	R025034	**Water Crossover**	1
15	RM0268	**Gasket**, water crossover	1
16	RA057030	**Water Pump Assembly**	1
17	RM0266	**Gasket**, water pump to engine block	2
18	R045126A	**Hose**, circulation pump to exchanger	1
19	RS3852	**Clamp**, hose (#28)	2
20	R024221	**Fitting**, 1 1/4” union (OEM specific, used with item 21A)	1
21	18402	**Hose**, raw water pump to transmission cooler	1
21A	R045137	**Hose**, raw water pump to trans cooler (OEM specific, cut-to-fit)	1
22	RS3858	**Clamp**, hose (#20)	20
23	R045171	**Hose**, raw water pump to oil cooler	1
24	20865	**Hose**, bulk, raw water pump to fuel cooler assembly (returnless fuel system only, cut-to-fit)	AR
25	R045136	**Hose**, fuel cooler assembly to oil cooler (returnless fuel system only, cut-to-fit)	1
26	R147049	**Oil Cooler Assembly**	1
27	R147006	**Transmission Cooler Assembly**	1
28	98223016	**Bolt**, strap clamp attaching	1
29	93920000	**Lockwasher**, strap clamp attaching	1
30	R090082	**Clamp**, strap 1	
31	R045131`	**Hose**, distribution housing to exhaust manifold (Port)	1
32	30624	**Fitting**, exhaust manifold (90 degree)	2
33	RS3554	**Plug**, drain	2
34	R024006A	**Fitting**, 90 degree	2
35	RS3851	**Clamp**, hose (#16)	6

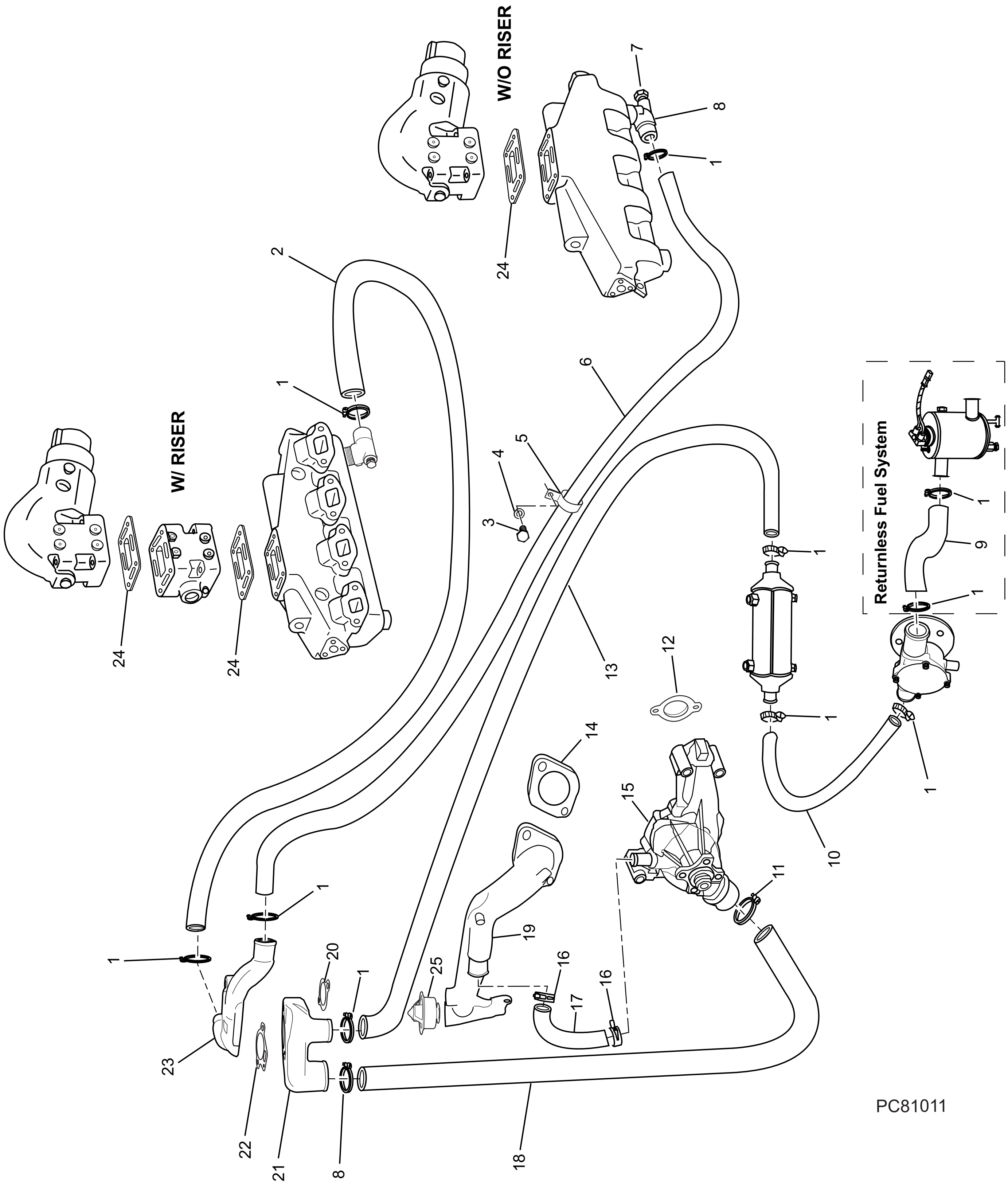
FRESH WATER COOLING SYSTEM COMPONENTS (2005) - FIGURE 16 (cont'd)



FRESH WATER COOLING SYSTEM COMPONENTS (2005) - FIGURE 16 (cont'd)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
36	98127	**Gasket**, elbow to riser / elbow to manifold / riser to manifold	8
37	98124	**Wing Plate**, blockoff	2
38	98124A	**Wing Plate**, pass thru	2
39	97852	**Fitting**, exhaust manifold/riser (1 1/4" hose)	2
40	R045167	**Hose**,tstat housing to exhaust manifold (Starboard)	1
40	18414	**Hose**, tstat housing to 4" riser (Starboard)	1
41	R045124	**Hose**, exchanger to exhaust elbow (Starboard)	1
41	R045124A	**Hose**, exchanger to exhaust elbow (Starboard "V"-Drive)	1
42	R045128	**Hose**, distribution housing to exhaust manifold (Starboard)	1
43	R045123	**Hose**, transmission cooler to heat exchanger	1
44	R045170	**Hose**, tstat housing to exhaust manifold (Port)	1
44	R045145A	**Hose**, tstat housing to 4" riser (Port)	1
45	R045125	**Hose**, heat exchanger to exhaust elbow (Port)	1
45	R045125A	**Hose**, heat exchanger to exhaust elbow (Port - "V"-Drive)	1
46	R127087	**Clamp**, Oetiker	1
47	R045132	**Hose**, bulk, degas bottle to distribution housing	AR
48	RS3854	**Clamp**, hose (#12)	2
49	R045153	**Hose**, bulk, degas bottle to heat exchanger (2")	AR
50	R045107	**Hose**, bulk, bypass - thermostat housing to heat exchanger (16")	AR
NI	R128001	**Cover**, hose clamp end (blue)	AR

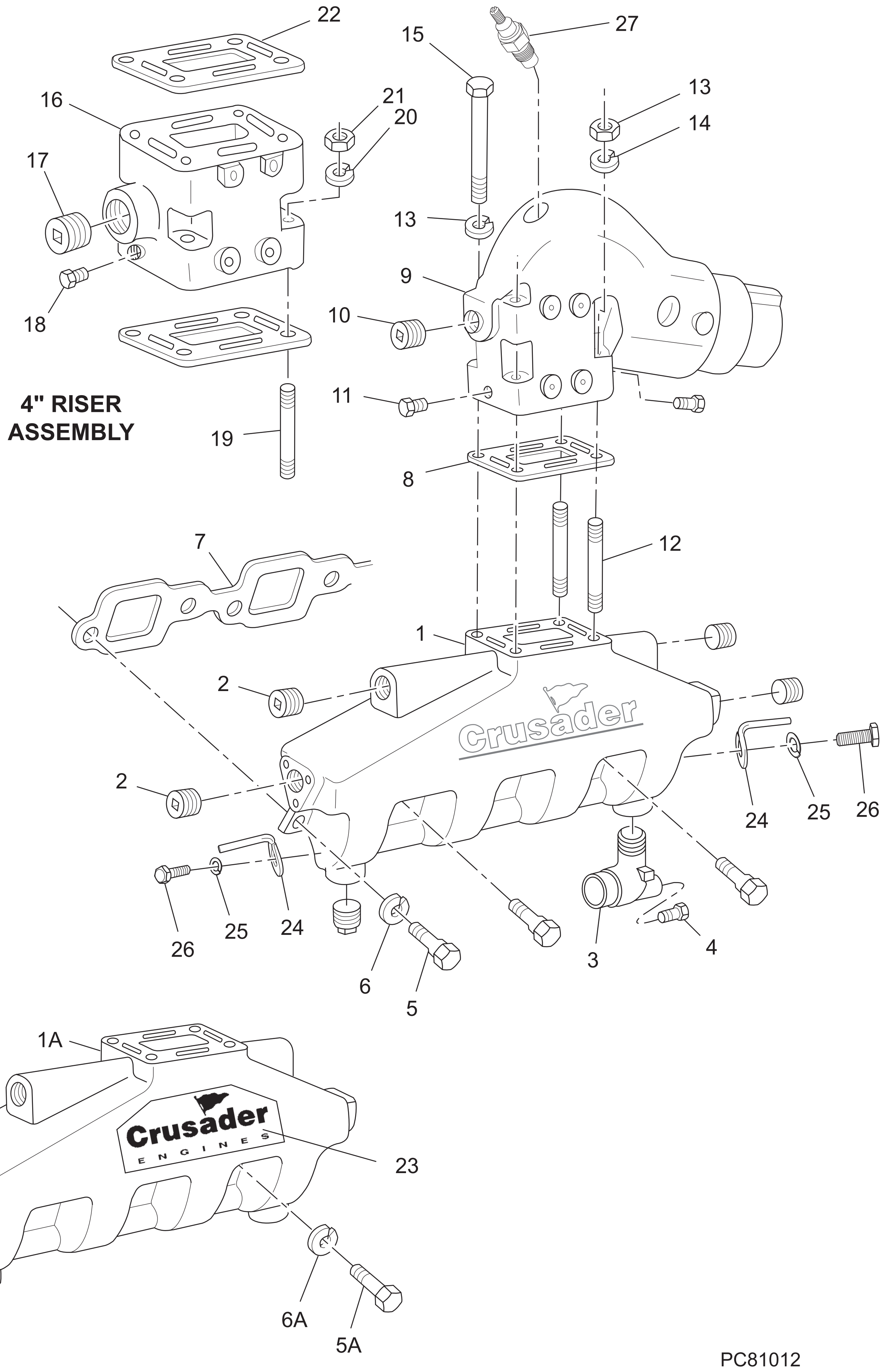
RAW WATER COOLING SYSTEM COMPONENTS - FIGURE 17



RAW WATER COOLING SYSTEM COMPONENTS - FIGURE 17

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RS3858	**Clamp**, hose (#20)	10
2	R045131	**Hose**, fill riser to exhaust manifold (Starboard)	1
3	98223016	**Bolt**, strap clamp attaching	1
4	93920000	**Lockwasher**, strap clamp attaching	1
5	R090082	**Clamp**, strap	1
6	R045128	**Hose**, fill riser to exhaust manifold (Port)	1
7	RS3554	**Plug**, drain	2
8	30624	**Fitting**, exhaust manifold (90 degree)	2
9	R045129	**Hose**, raw water pump to fuel cooler assembly (returnless fuel system only)	AR
10	R045122	**Hose**, raw water pump to oil cooler	1
11	RS3855	**Clamp**, hose (#32)	2
12	RM0266	**Gasket**, water pump to engine block	2
13	R045137	**Hose**, fill riser to oil cooler	1
14	RM0268	**Gasket**, water crossover	2
15	RA057030	**Water Pump Assembly**	1
16	RS3864	**Clamp**, hose	2
17	R045116A	**Hose**, circulation pump to water crossover	1
18	R045138	**Hose**, circulation pump to fill riser	1
19	R025034	**Water Crossover**	1
20	RM0121	**Gasket**, distribution housing to water crossover	1
21	R025028	**Fill Riser**, lower	1
22	RM0256	**Gasket**, upper fill riser to lower fill riser	1
23	R025029	**Fill Riser**, upper	1
24	98127	**Gasket**, elbow to riser / elbow to manifold / riser to manifold	4
25	R026002	**Thermostat** (160 degree)	1

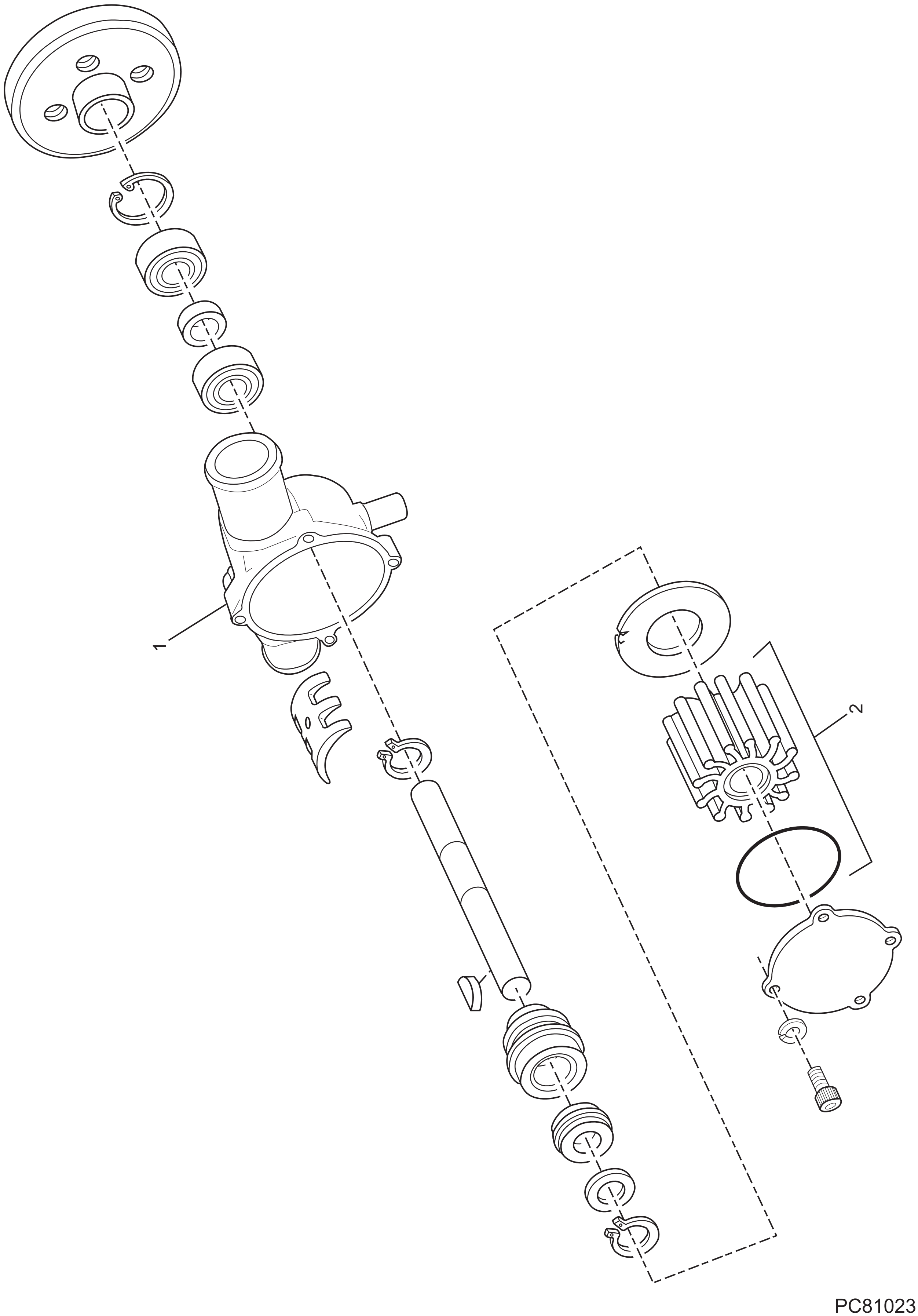
EXHAUST MANIFOLD and COMPONENTS - FIGURE 18



EXHAUST MANIFOLD and COMPONENTS - FIGURE 18

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	98125	**Exhaust Manifold (Embossed Logo)** (MUST use bolt R009206)	2
1A	R028021	**Exhaust Manifold (Picture Frame Logo)**	2
2	103876	**Plug**, exhaust manifold (1”)	8
3	30624	**Fitting**, water elbow (90 degree)	2
4	RS3552	**Plug**, drain	2
5	R009206	**Shouldered Bolt**, manifold (embossed)	16
5A	98333035	**Bolt**, manifold (picture frame)	16
6	RS2180	**Lockwasher**, manifold bolt (embossed)	16
6A	93930000	**Lockwasher**, manifold bolt (picture frame)	16
7	RM0294	**Gasket**, manifold to cylinder head	2
8	98127	**Gasket**, manifold to exhaust elbow	2
9	R029015	**Exhaust Elbow Assembly**,	2
10	RS3556	**Plug**, exhaust elbow (3/4”)	2
11	RS3554	**Plug**, drain	4
12	20827	**Stud**, exhaust elbow attaching (T)	4
13	93300000	**Lockwasher**, elbow attaching stud	8
14	95300000	**Nut**, elbow attaching stud	4
15	90305475	**Bolt**, exhaust elbow attaching (4 3/4”)	4
*	22818	**4-Inch Riser Kit**	1
16	98128	**Exhaust Riser**	2
17	RS3556	**Plug**, exhaust riser (3/4”)	2
18	RS3554	**Plug**, drain	4
19	20783	**Stud**, riser mounting (2 3/4”)	8
20	93300000	**Lockwasher**, riser mounting stud	8
21	95300000	**Nut**, riser mounting stud	8
22	98127	**Gasket**, riser mounting	4
23	R143129	**Decal**, exhaust manifold (picture frame)	2
24	R096144	**Bracket**, spark plug wire loom	4
25	RS0302	**Lockwasher**, attaching bolt	4
26	RS2180	**Bolt**, wire loom attaching	4
27	R020047	**Switch**, exhaust temperature (‘04 Only)	2
		***NOTE:** See Fresh Water Cooling section for parts used on Fresh Water Cooled engines.	

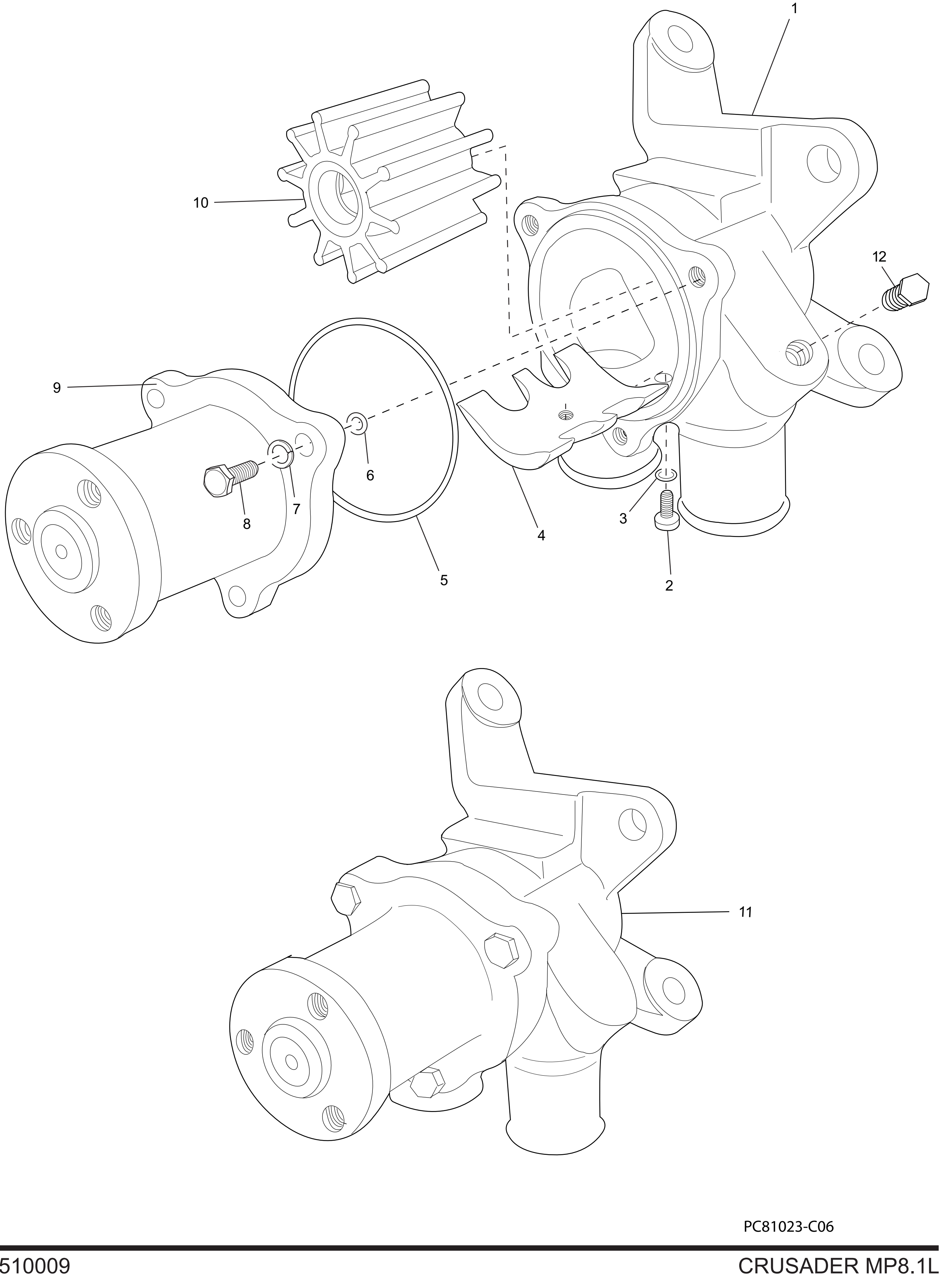
RAW WATER COOLING PUMP (2001-2004) - FIGURE 19



RAW WATER COOLING PUMP (2001-2004) - FIGURE 19

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RA057028	**Raw Water Pump Assembly**	1
2	RP061017	**Kit,** impeller	1

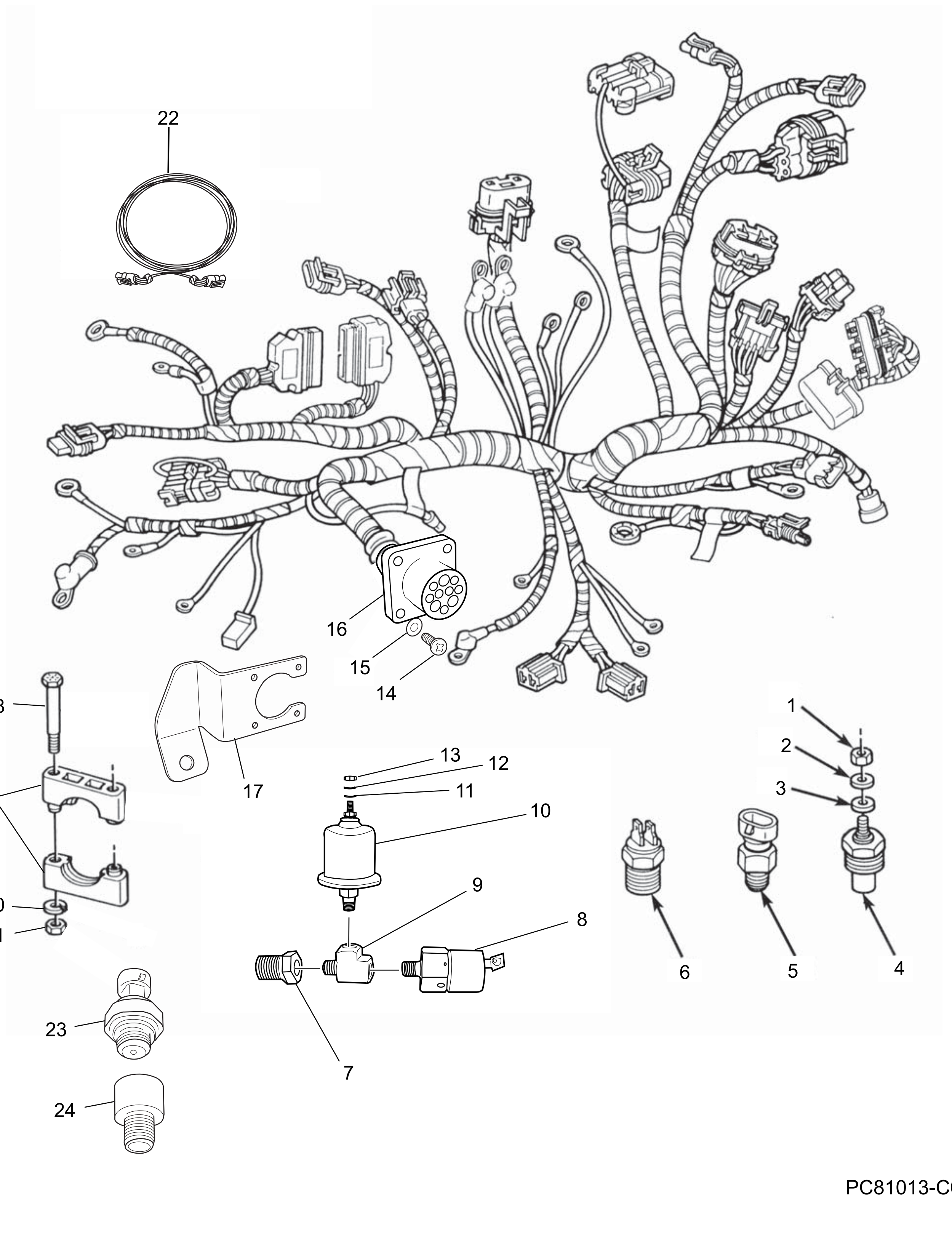
RAW WATER COOLING PUMP (2005) - FIGURE 20



RAW WATER COOLING PUMP (2005) - FIGURE 20

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R057035	**Housing,** raw water pump	1
2	TBD	**Bolt,** raw water pump cam	1
3	TBD	**Lockwasher,** raw water pump cam	1
4	R161018	**Cam,** raw water pump	1
5	R047242	**O-ring,** bearing housing attaching	1
6	R047243	**O-ring,** bearing housing attaching bolt	3
7	TBD	**Lockwasher,** bearing housing attaching bolt	3
8	TBD	**Bolt,** bearing housing attaching	3
9	RA134071	**Bearing Housing Assembly**	1
10	RP061022	**Impeller Kit,** (includes O-rings and impeller)	1
11	RA057035	**Raw Water Pump Assembly**	1
12	RS3554	**Plug**, brass 1/8 NPT	1
NI	RF057026/35	**Raw Water Pump Retrofit Kit** (retrofits this pump system onto a 2004 MY or prior engine)	AR

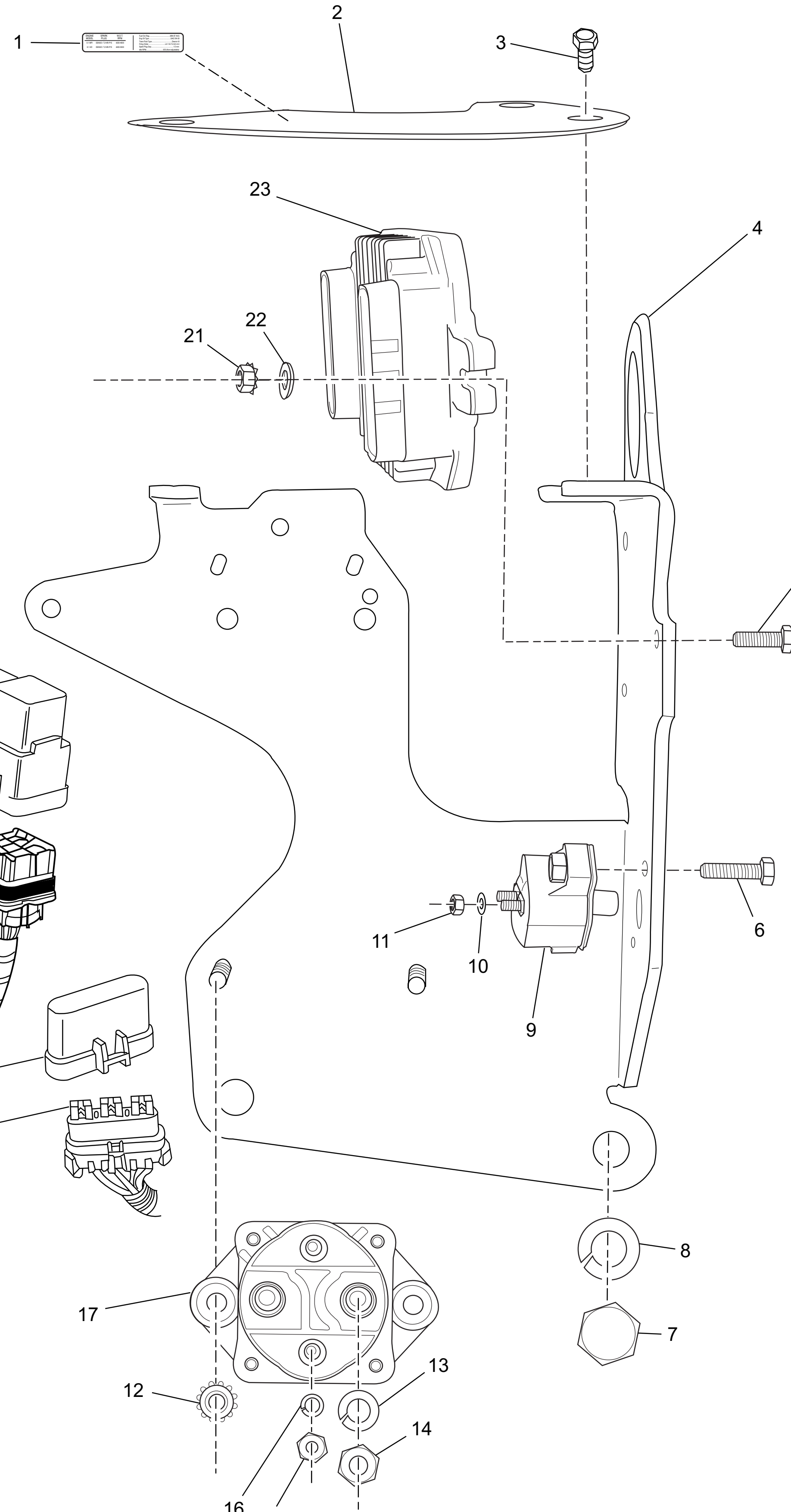
WIRING HARNESS ASSEMBLIES and SENDERS - FIGURE 21



WIRING HARNESS ASSEMBLIES and SENDERS - FIGURE 21

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RS1540	**Nut**, sender terminal	1
2	RS2197	**Lockwasher**, sender terminal	1
3	RS2746	**Washer**, sender terminal	1
4	R020003	**Sender**, temperature (SS)	1
4	R020005	**Sender**, temperature (DS)	AR
4	22701	**Sender**, temperature (SS-VDO)	AR
4	22703	**Sender**, temperature (DS-VDO)	AR
5	R020019	**Sensor**, engine coolant temperature (ECT)	1
6	R020037	**Switch**, transmission alarm	1
7	RS3677	**Adapter**, sender attaching tee	1
8	R020015A	**Switch**, oil pressure (SS)	1
9	R024145	**Tee**, sender attaching	1
10	R020001	**Sender**, oil pressure (SS)	1
10	R020006	**Sender**, oil pressure (DS)	AR
10	22702	**Sender**, oil pressure (SS-VDO)	AR
10	22704	**Sender**, oil pressure (DS-VDO)	AR
11	RS2746	**Washer**, sender terminal	1
12	RS2197	**Lockwasher**, sender terminal	1
13	RS1540	**Nut**, sender terminal	1
14	RS5115	**Screw**, 10-pin attaching	4
15	R096142	**Washer**, 10-pin attaching	4
16	RA121071	**Engine Wiring Harness Assembly** (S/N 610000 Thru 631659) (MUST be used with relay, p/n R130012)	1
16	RA121071B	**Engine Wiring Harness Assembly** (S/N 631660 and above) (MUST be used with relay, p/n R130011A)	1
16	RA121084	**Engine Wiring Harness Assembly** (OEM specific) (MY 2005) (16-Pin Boat Harness Connector) (MUST be used with relay, p/n R130011A)	1
17	R090251	**Bracket**, 10-pin attaching (square base)	1
18	90105300	**Bolt**, 10-pin clamp attaching (round base)	1
19	R127093	**Clamp**, 10-pin attaching (round base)	1
20	92100000	**Lockwasher**, 10-pin attaching clamp (round base)	1
21	95104300	**Nut**, 10-pin attaching clamp (round base)	1
22	RA121072	**Harness**, slave 3-pin connector (twin applications only)	AR
22	RA121072A	**Harness**, slave 4-pin connector (twin applications only)	AR
22	RA121072B	**Harness**, slave 3-pin to 4-pin connector (twin applications only)	AR
23	R020048	**Sensor**, CAN BUS oil pressure (OEM specific)	1
24	R024223	**Adapter**, CAN BUS oil pressure sensor (OEM specific)	1
NI	RA121062D	**Harness**, fuel pump extension (OEM specific)	1

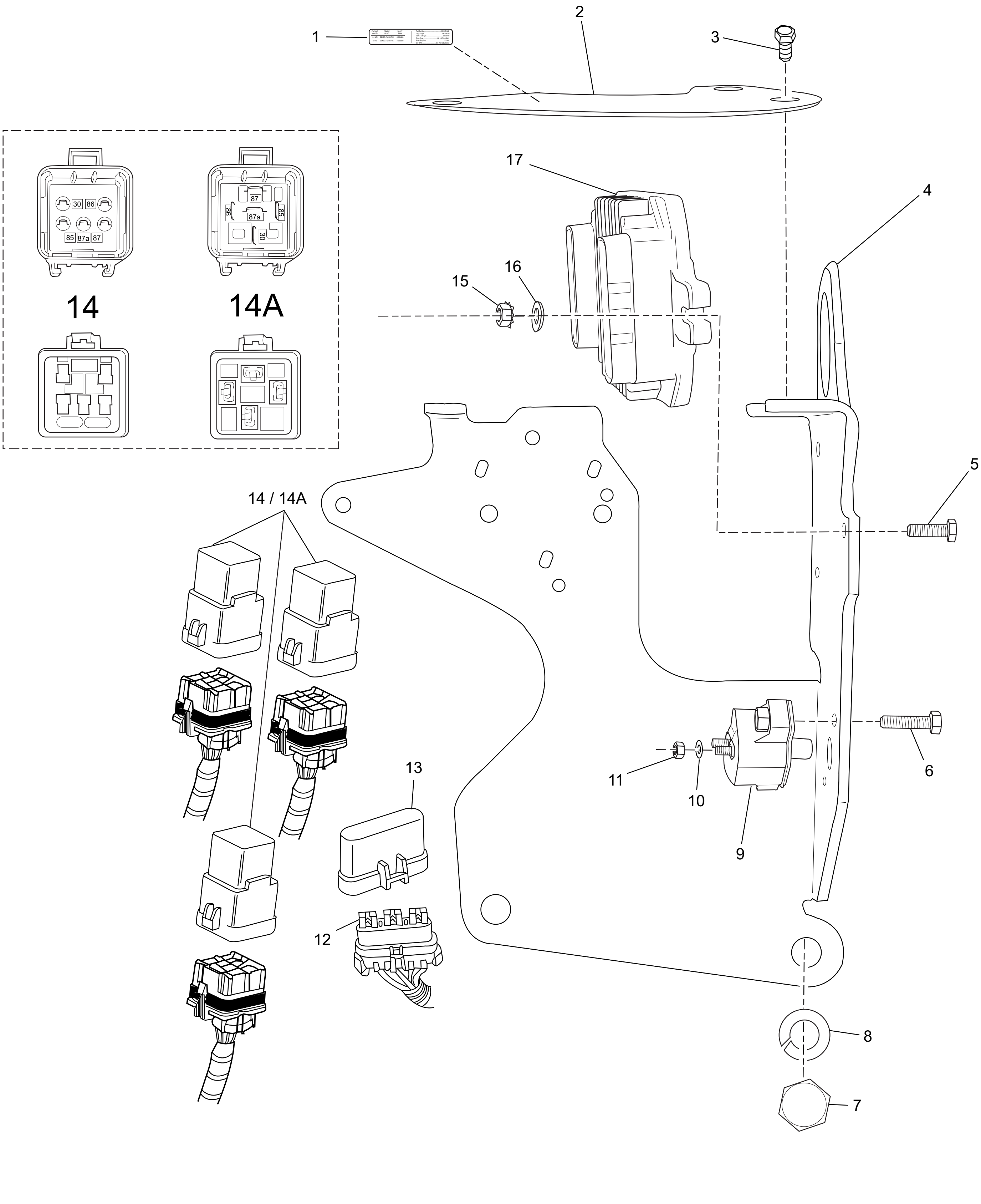
ECM and RELAYS (THRU S/N 630396) - FIGURE 22



ECM and RELAYS (THRU S/N 630396) - FIGURE 22

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R143128	**Decal**, ECM cover	1
2	R126015	**Cover**, ECM	1
3	RS5126	**Screw**, ECM cover attaching	3
4	R090231	**Bracket**, ECM/relay mounting	1
5	RS0254	**Bolt**, ECM mounting	3
6	RS5084	**Bolt**, circuit breaker mounting	2
7	98443025	**Bolt**, ECM/relay mounting bracket attaching	2
8	93940000	**Lockwasher**, bracket mounting bolt	2
9	R153006B	**Circuit Breaker Assembly (50 amp)**	1
10	P/O item 9	**Washer**, circuit breaker terminal	2
11	P/O item 9	**Nut**, circuit breaker terminal	2
12	RS1078	**Nut**, starter relay mounting star washer	2
13	RS2200	**Lockwasher**, solenoid terminal (5/16”)	1
14	RS1046	**Nut**, solenoid terminal (5/16”)	1
15	RS1540	**Nut**, solenoid terminal (#10)	1
16	RS2197	**Lockwasher**, solenoid terminal (#10)	1
17	R130014	**Solenoid**, starter slave	1
18	R153017B	**Fuses**, 20 amp	3
19	R126014	**Cover**, fuse holder	1
20	R130012	**Relay Assembly**, fuel pump and ignition	2
21	RS1078	**Nut**, ECM mounting star washer	3
22	92100000	**Washer**, ECM mounting	1
23	R116021A cksum - 32956	**Electronic Control Module (thru ‘04 MY)** OLD Coils (STD - prior to S/N 621056)	1
23	R116021C cksum - 40051	**Electronic Control Module (thru ‘04 MY)** OLD Coils (HO - prior to S/N 630082)	1
23	R116021F cksum - 31582	**Electronic Control Module (thru ‘04 MY)** NEW Coils (STD - S/N 621056 and above)	1
23	R116021G cksum - 39560	**Electronic Control Module (thru ‘04 MY)** NEW Coils (HO - S/N 630082 and above)	1

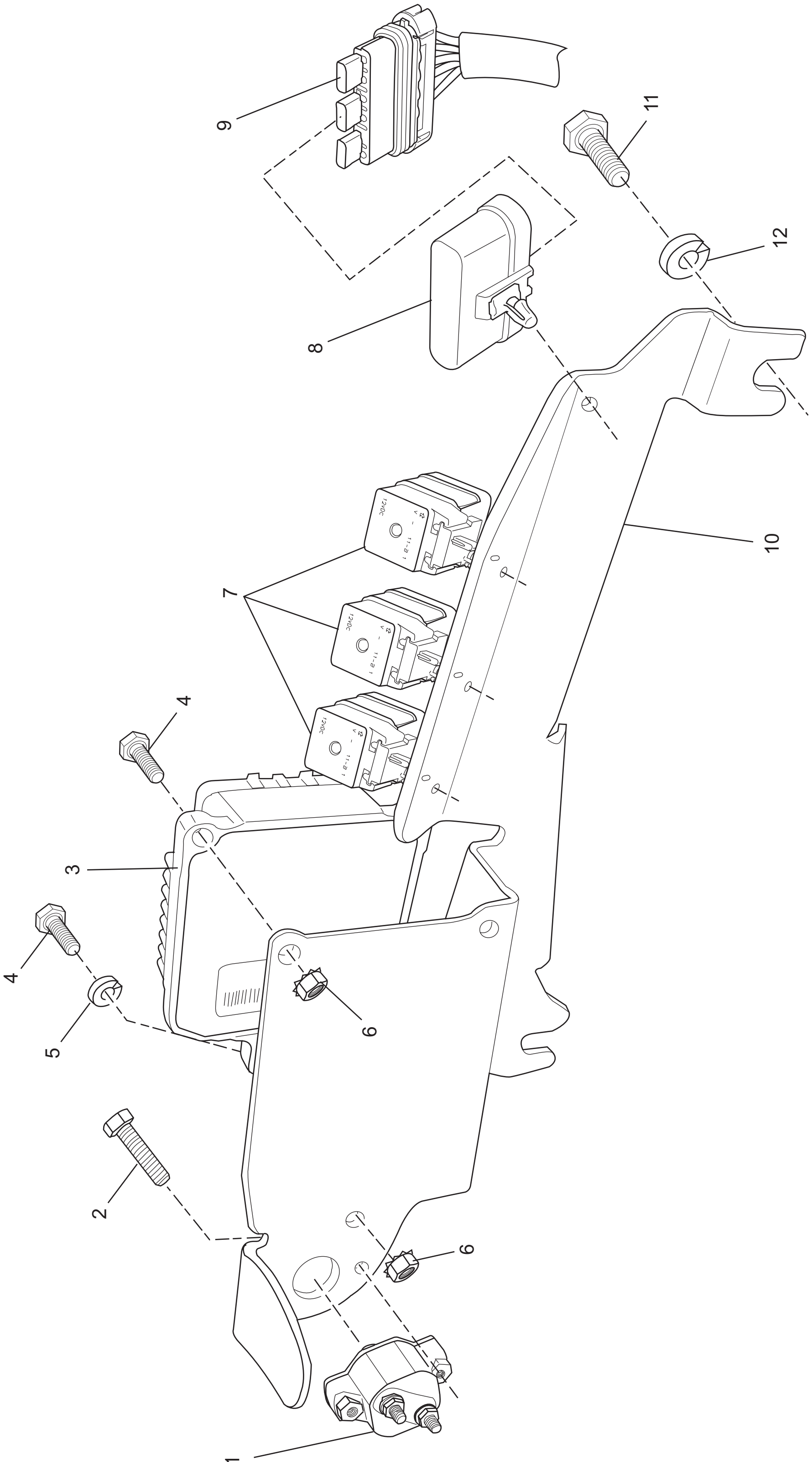
ECM and RELAYS (S/N 630397 and ABOVE) - FIGURE 23



ECM and RELAYS (S/N 630397 and ABOVE) - FIGURE 23

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R143128	**Decal**, ECM cover	1
2	R126015	**Cover**, ECM	1
3	RS5126	**Screw**, ECM cover attaching	3
4	R090231	**Bracket**, ECM/relay mounting	1
5	RS0254	**Bolt**, ECM mounting	3
6	RS5084	**Bolt**, circuit breaker mounting	2
7	98443025	**Bolt**, ECM/relay mounting bracket attaching	2
8	93940000	**Lockwasher**, bracket mounting bolt	2
9	R153006B	**Circuit Breaker Assembly (50 amp)**	1
10	P/O item 9	**Washer**, circuit breaker terminal	2
11	P/O item 9	**Nut**, circuit breaker terminal	2
12	R153017B	**Fuses**, 20 amp	3
13	R126014	**Cover**, fuse holder	1
14	R130012	**Relay**, fuel pump, ignition, starter (s/n 610000 thru 631659)	AR
14A	R130011A	**Relay**, fuel pump, ignition, starter (s/n 631660 and above)	AR
15	RS1078	**Nut**, ECM mounting star washer	3
16	92100000	**Washer**, ECM mounting	1
17	R116021A cksum - 32956	**Electronic Control Module (thru ‘04 MY)** OLD Coils (STD - prior to S/N 621056)	1
17	R116021C cksum - 40051	**Electronic Control Module (thru ‘04 MY)** OLD Coils (HO - prior to S/N 630082)	1
17	R116021F cksum - 31582	**Electronic Control Module (thru ‘04 MY)** NEW Coils (STD - S/N 621056 and above)	1
17	R116021G cksum - 39560	**Electronic Control Module (thru ‘04 MY)** NEW Coils (HO - S/N 630082 and above)	1

ECM and RELAYS (2005) - FIGURE 24

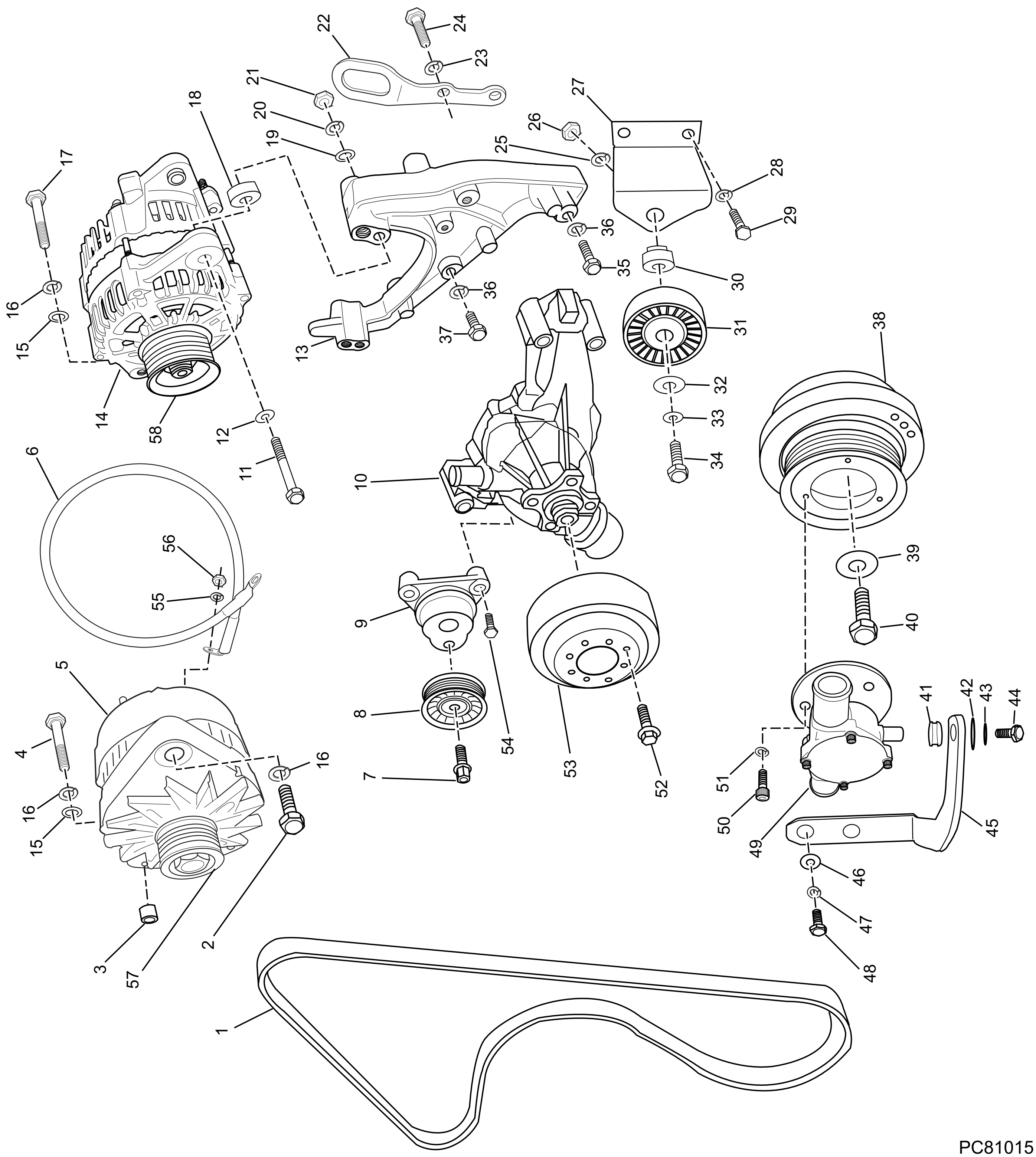


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ECM and RELAYS (2005) - FIGURE 24

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R143128	**Decal**, ECM cover	1
1	R153006C	**Circuit Breaker (60 amp)**	1
NI	R143176	**Decal,** Fuse Block	1
NI	R143177	**Decal,** Main Circuit Breaker	1
2	RS5084	**Bolt,** circuit breaker attaching	2
3	R116021R cksum - 26491/ 26197	**Electronic Control Module (ECM)** 10-Pin Boat Harness Connector (STD)	1
3	R116021S cksum - 38073	**Electronic Control Module (ECM)** 10-Pin Boat Harness Connector (HO)	1
3	R116021P cksum - 39199	**Electronic Control Module (ECM)** 16-Pin Boat Harness Connector (HO)	1
4	RS0254	**Bolt,** ECM attaching	3
5	92100000	**Washer,** ECM attaching	1
6	RS1078	**Nut**, KEPS, ECM mounting	3
7	R130011A	**Relay,** fuel pump, ignition, starter	3
8	R126014	**Cover,** fuse holder	1
9	R153017B	**Fuses,** 20 amp	3
10	R090310	**Bracket,** ECM/Relay	1
11	98443025	**Bolt,** ECM/Relay bracket attaching	2
12	93940000	**Lockwasher,** ECM/Relay bracket attaching	2

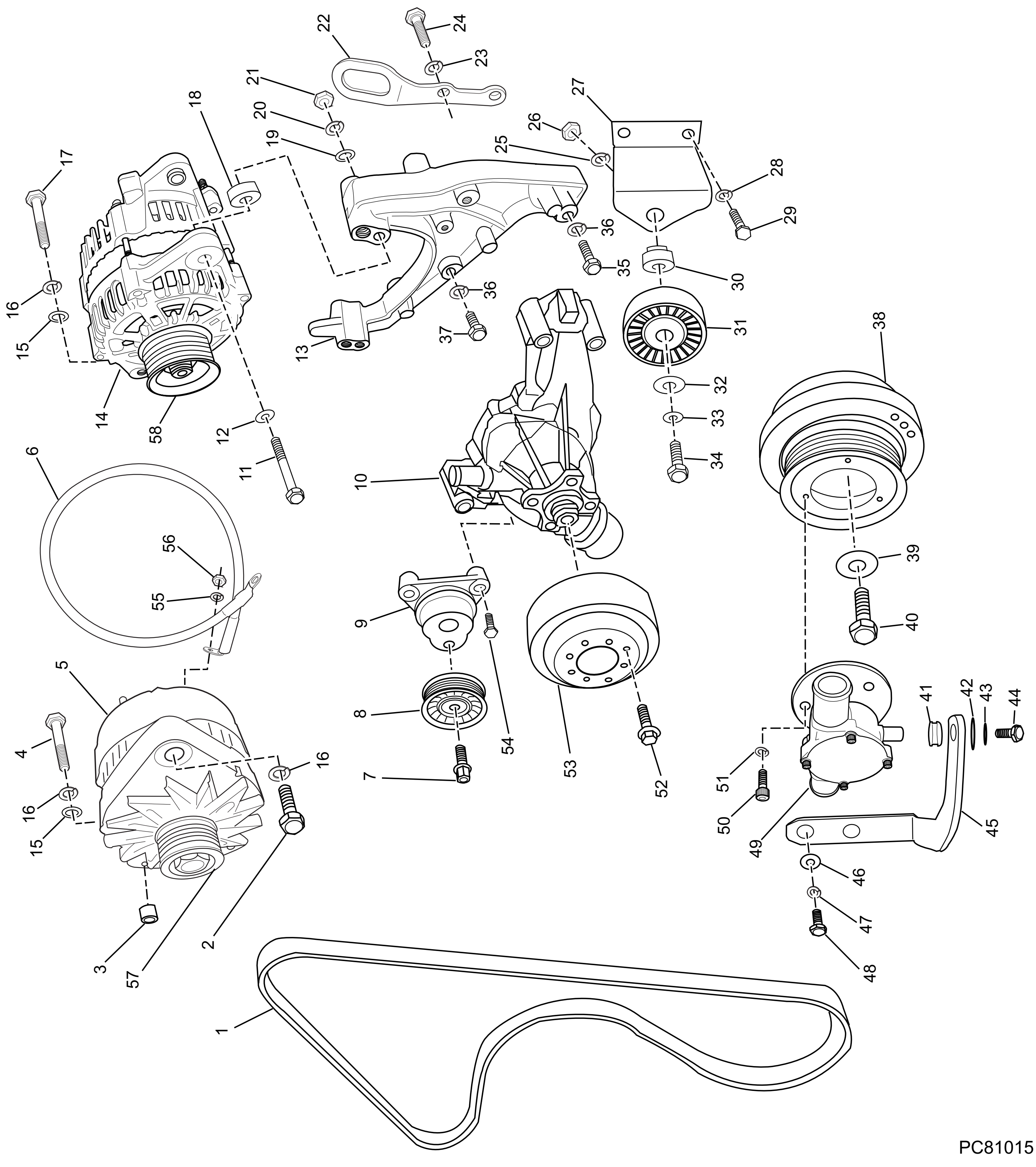
ACCESSORY DRIVE SYSTEM COMPONENTS (2001-2004) - FIGURE 25



ACCESSORY DRIVE SYSTEM COMPONENTS (2001-2004) - FIGURE 25

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R066024	**Belt**, accessory drive	1
2	90505200	**Bolt**, mounting (100 amp alternator only)	AR
3	R062082	**Spacer**, mounting (100 amp alternator only)	AR
4	90205300	**Bolt**, mounting (100 amp alternator only)	AR
5	RA097008	**Alternator Assembly**, (100 amp)	AR
6	R101012	**Cable**, ground (100 amp alternator only)	AR
7	TBD	**Bolt**, tensioner attaching	1
8	TBD	**Pulley**, belt tensioner	1
9	RA068001	**Tensioner**, belt	1
10	RA057030	**Water Pump Assembly**	1
11	98333110	**Bolt**, alternator attaching (70 amp)	1
12	92930000	**Washer**, alternator attaching bolt (70 amp)	1
13	R090225	**Bracket**, alternator mounting (70 amp)	1
14	RA097007	**Alternator Assembly**, (70 amp)	1
15	92930000	**Washer**, alternator attaching bolt	1
16	93930000	**Lockwasher**, alternator attaching bolt	1
17	90205300	**Bolt**, alternator attaching (70 amp)	1
18	R062081	**Spacer**, alternator mounting (70 amp)	1
19	92930000	**Washer**, alternator mounting bolt	1
20	93930000	**Lockwasher**, alternator mounting bolt	1
21	97330000	**Nut**, alternator mounting	1
22	R042009	**Bracket**, lift	1
23	93940000	**Lockwasher**, lift bracket attaching bolt	2
24	98443025	**Bolt**, lift bracket attaching	2
25	93940000	**Lockwasher**, idler pulley attaching bolt	1
26	97440000	**Nut**, idler pulley attaching bolt	1
27	R090232	**Bracket**, idler pulley mounting	1
28	93940000	**Lockwasher**, idler pulley mounting bracket bolt	2
29	98443025	**Bolt**, idler pulley mounting bracket	2
30	R062083	**Spacer**, idler pulley	1
31	R065040	**Pulley**, idler	1
32	R096145	**Washer**, idler pulley attaching bolt large	1
33	92940000	**Washer**, idler pulley attaching bolt small	1
34	98443050	**Bolt,** idler pulley attaching	1
35	98449055	**Bolt**, alternator bracket attaching bolt (long)	1
36	93940000	**Lockwasher**, alternator bracket attaching bolt	2
37	L00926	**Bolt**, alternator bracket attaching (short)	1
38	R064015	**Balancer**, crankshaft (STD)	1
38	R064015A	**Balancer**, crankshaft (HO)	1

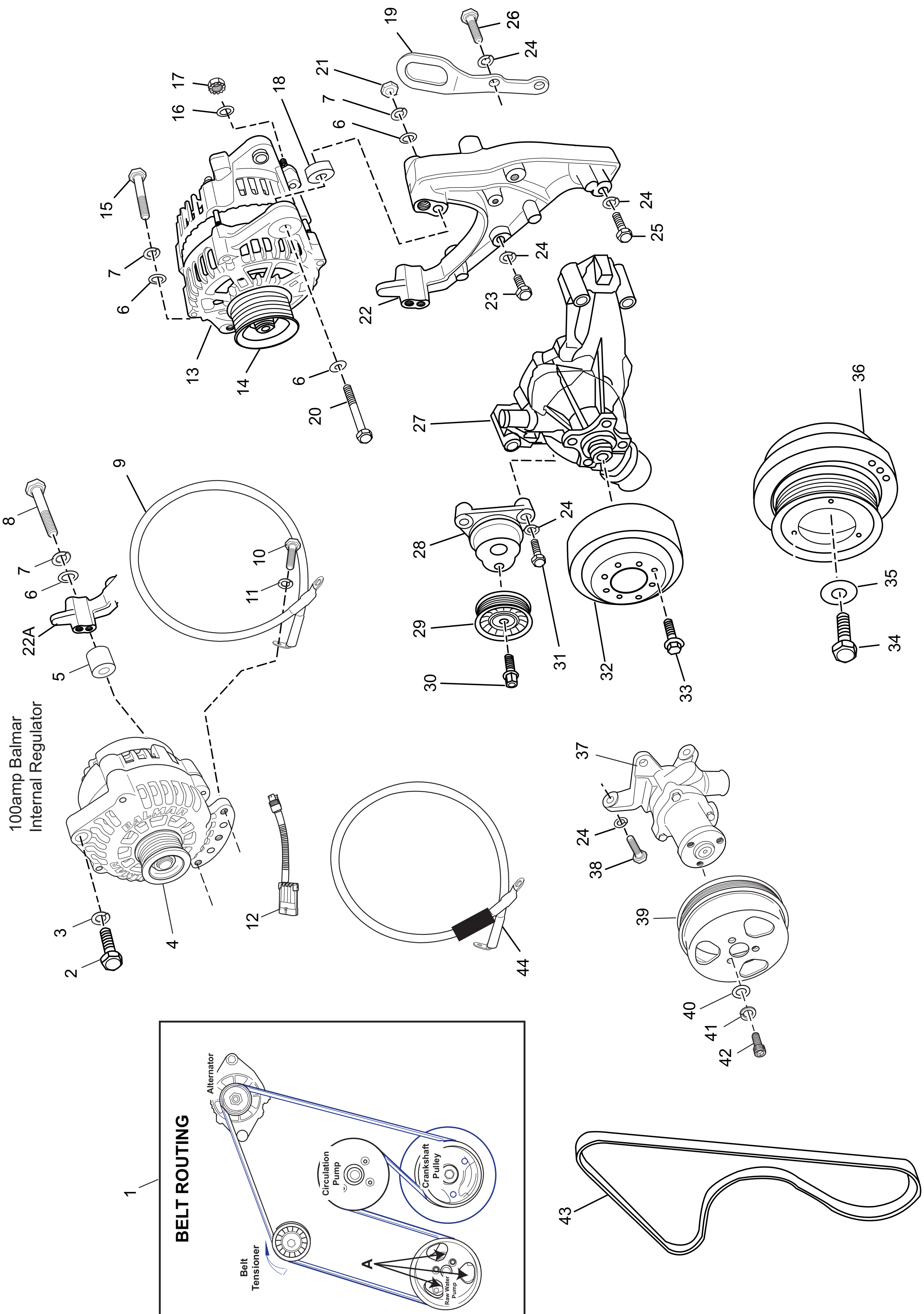
ACCESSORY DRIVE SYSTEM COMPONENTS (2001-2004) (cont'd) - FIGURE 25



ACCESSORY DRIVE SYSTEM COMPONENTS (2001-2004) (cont'd) - FIGURE 25

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
39	TBD	**Washer**, crankshaft balancer	1
40	TBD	**Bolt**, crankshaft balancer	1
41	R094038	**Grommet**, rubber	1
42	RS2673	**Washer**, mounting bolt large	1
43	RS2179	**Washer**, mounting bolt small	1
44	RS0280	**Bolt**, raw water pump mounting	1
45	R090216	**Bracket**, raw water pump mounting	1
46	92940000	**Washer**, raw water pump mounting bracket	2
47	93940000	**Lockwasher**, raw water pump mounting bracket	2
48	98443025	**Bolt**, raw water pump mounting bracket	2
49	RA057028	**Raw Water Pump Assembly**	1
50	99443030	**Bolt**, raw water pump-to-balancer mounting	3
51	93940000	**Lockwasher**, raw water pump-to-balancer mounting	3
52	TBD	**Bolt**, engine circulating pump pulley mounting	4
53	R065044	**Pulley**, engine circulating pump	1
54	98443050	**Bolt**, belt tensioner mounting	2
55	TBD	**Lockwasher**, ground cable attaching (100 amp only)	1
56	TBD	**Nut**, ground cable attaching (100 amp only)	1
57	R065042	**Pulley**, alternator, 100A	1
58	R065043	**Pulley**, alternator, 70A	1

ACCESSORY DRIVE SYSTEM COMPONENTS (2005) - FIGURE 26

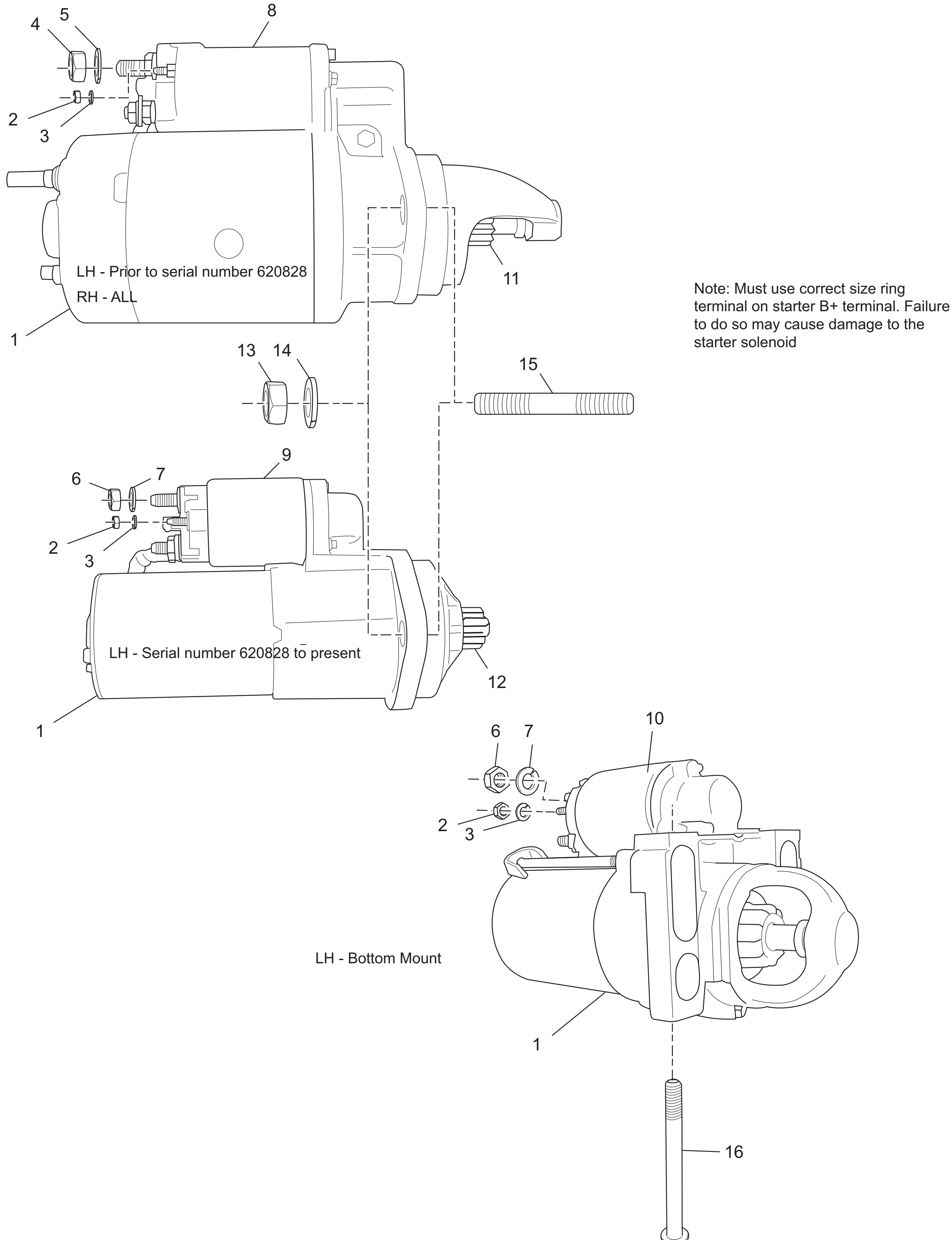


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ACCESSORY DRIVE SYSTEM COMPONENTS (2005) - FIGURE 26

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R143136A	**Decal**, belt routing	1
2	90505200	**Bolt**, mounting (100 amp alternator only)	1
3	93500000	**Lockwasher**, mounting (100 amp alternator only)	1
4	RA097010	**Alternator Assembly**, (100 amp)	1
5	R062082	**Spacer**, mounting (100 amp alternator only)	1
6	92930000	**Washer**, alternator attaching bolt	4
7	93930000	**Lockwasher**, alternator attaching bolt	3
8	90205300	**Bolt**, mounting (100 amp alternator only)	1
9	R101015	**Cable**, ground	1
10	RS0279	**Bolt**, cable attaching (100 amp alternator only)	1
11	RS2179	**Lockwasher**, cable attaching (100 amp alternator only)	1
12	R121081	**Harness**, jumper, 100 amp alternator	1
13	RA097007	**Alternator Assembly**, (70 amp)	1
14	R065043	**Pulley**, alternator, 70A	1
15	90205300	**Bolt**, alternator attaching (70 amp)	1
16	RS2672	**Washer**, cable attaching (70 amp)	2
17	97220060	**Nut**, KEPS, cable attaching (70 amp)	2
18	R062081	**Spacer**, alternator mounting (70 amp)	1
19	R042009	**Bracket**, lift	1
20	98333110	**Bolt**, alternator attaching (70 amp)	1
21	97330000	**Nut**, alternator mounting	1
22	R090225	**Bracket**, alternator mounting (70 amp)	1
22A	R090225A	**Bracket**, alternator mounting (100 amp)	1
23	L00926	**Bolt**, alternator bracket attaching (short)	1
24	93940000	**Lockwasher**, bracket attaching	9
25	98449055	**Bolt**, alternator bracket attaching bolt (long)	1
26	98443025	**Bolt**, lift bracket attaching	2
27	RA057030	**Water Pump Assembly**	1
28	RA068001	**Tensioner**, belt	1
29	R065057	**Pulley**, belt tensioner	1
30	TBD	**Bolt**, tensioner pulley attaching	1
31	98449050	**Bolt**,tensioner mounting	2
32	R065044	**Pulley**, circulation pump	1
33	TBD	**Bolt,** circ. pump pulley attaching	4
34	TBD	**Bolt**, crankshaft balancer	1
35	TBD	**Washer**, crankshaft balancer	1
36	R064015	**Balancer**, crankshaft	1
37	RA057035	**Raw Water Pump Assembly**	1
38	98443030	**Bolt**, raw water pump mounting	3
39	R065056	**Pulley**, raw water pump	1
40	92934000	**Washer**, pulley mounting	3
41	93934000	**Lockwasher**, pulley mounting	3
42	99335016	**Bolt,** pulley pulley attaching	3
43	R066024A	**Belt**, accessory drive	1
44	R153018A	**Cable**, 100A Fuse Link, Starter to Circuit Breaker	1

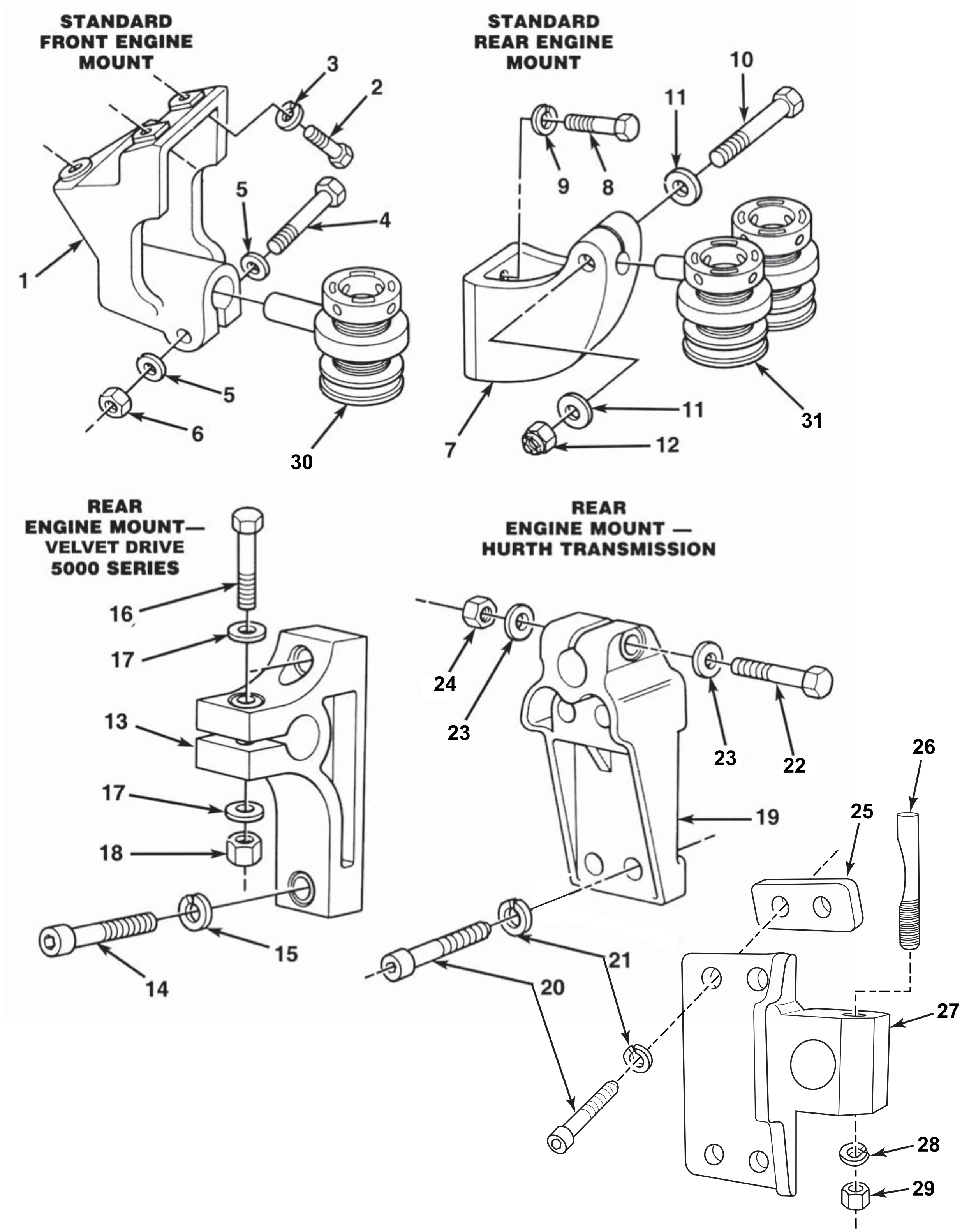
STARTER ASSEMBLY COMPONENTS - FIGURE 27



STARTER ASSEMBLY COMPONENTS - FIGURE 27

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RA122009	**Starter Motor Assembly** (LH rotation)	1
1	RA122015	**Starter Motor Assembly** (LH, bottom mount)	1
2	RS7036	**Nut**, solenoid terminal	1
3	93003000	**Lockwasher**, solenoid terminal	1
4	RS7019	**Nut**, solenoid terminal	1
5	RS7081	**Lockwasher**, solenoid terminal	1
6	RS7018	**Nut**, solenoid terminal	1
7	RS7080	**Lockwasher**, solenoid terminal	1
8	RU0050	**Solenoid Assembly**, starter	1
9	RU0050B	**Solenoid Assembly**, starter	1
10	RU0050A	**Solenoid**, starter (bottom mount)	1
11	RU0051	**Drive Assembly**, clutch (LH)	1
12	TBD	**Drive**, starter	1
13	RS1029	**Nut**, starter mounting	2
14	RS2181	**Lockwasher**, starter mounting	2
15	R031018	**Stud**, starter mounting	2
16	R009203	**Bolt**, starter mounting	2

ENGINE and TRANSMISSION MOUNTS - FIGURE 28



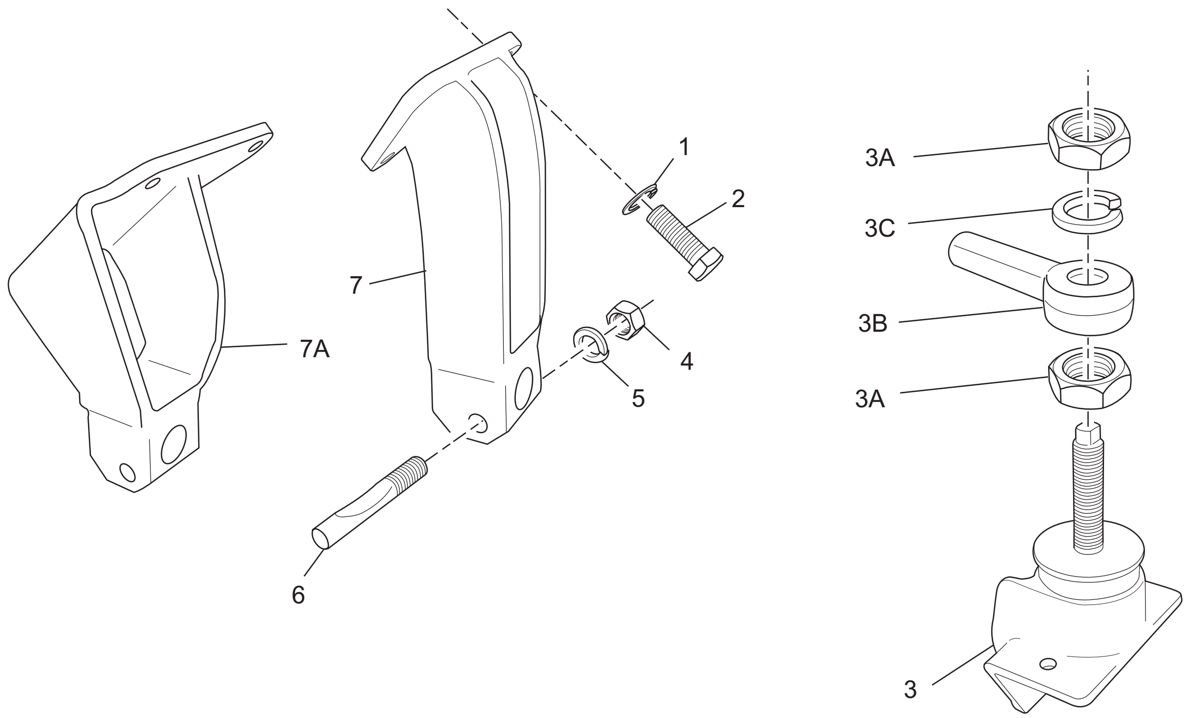
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ENGINE and TRANSMISSION MOUNTS - FIGURE 28

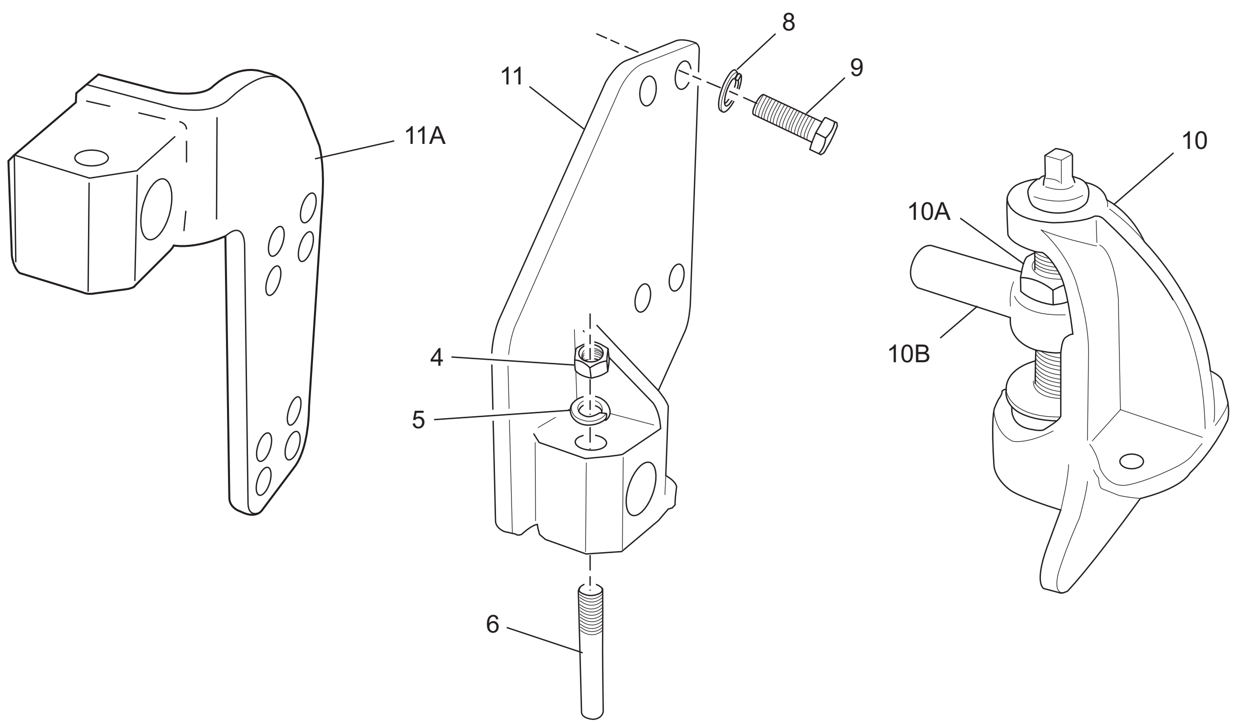
ITEM	PART NUMBER	DESCRIPTION	QUANTITY
		****Standard Front Engine Mount****	
1	97938	**Bracket**, engine mounting (front)	2
2	99443030	**Bolt**, socket head, upper	4
2	98443030	**Bolt**, hex head, lower	2
3	93940000	**Lockwasher**, bracket mounting bolt	6
4	90318225	**Bolt**, trunnion shaft (2 1/4”)	2
5	92300000	**Washer**, trunnion bolt	4
6	95310300	**Nut**, trunnion bolt - locking	2
		****Standard Rear Engine Mount****	
7	97917	**Bracket**, engine mounting (Rear)	2
8	RS0328	**Bolt**, bracket to transmission (1 1/4”)	4
9	RS2181	**Lockwasher**, bracket mounting bolt	4
10	90318325	**Bolt**, trunnion shaft (3 1/4”)	2
11	92300000	**Washer**, trunnion bolt	4
12	95310300	**Nut**, trunnion bolt - locking	2
		****Rear Engine Mount - Velvet Drive 5000 Series****	
13	98224	**Bracket**, transmission mounting (Starboard)	1
13	98225	**Bracket**, transmission mounting (Port)	1
14	RS6336	**Bolt**, bracket to transmission (12 mm x 60 mm)	4
15	RS7071	**Lockwasher** (12 mm)	4
16	90318325	**Bolt**, trunnion shaft (3 1/4”)	2
17	92300000	**Washer**, trunnion bolt	4
18	95310300	**Nut**, trunnion bolt - locking	2
		****Rear Engine Mount - Hurth Transmission****	
19	98077	**Bracket**, engine mounting (rear)	2
20	RS6331	**Bolt**, bracket to transmission (12 mm x 35 mm)	4
20	RS6336	**Bolt**, bracket to transmission (12 mm x 60 mm)	4
21	RS7071	**Lockwasher** (12 mm)	8
22	90318325	**Bolt**, trunnion shaft (3 1/4”)	2
23	92300000	**Washer**, trunnion bolt	4
24	95310300	**Nut**, trunnion bolt - locking	2
25	R109049	**Spacer**, bracket to transmission	2
26	R095020	**Bolt**, trunnion shaft	2
27	R090217	**Bracket**, engine mounting (port)	1
27	R090218	**Bracket**, engine mounting (starboard)	1
28	RS2181	**Lockwasher**, trunnion bolt	2
29	RS1529	**Nut**, trunnion bolt - locking	2
		****Mount Supports****	
30	97926	**Mount**, engine support (single front)	2
31	97905	**Mount**, engine support (dual rear)	2

OPTIONAL ENGINE and TRANSMISSION MOUNTS (OEM SPECIFIC)- FIGURE 29

OPTIONAL FRONT MOUNT



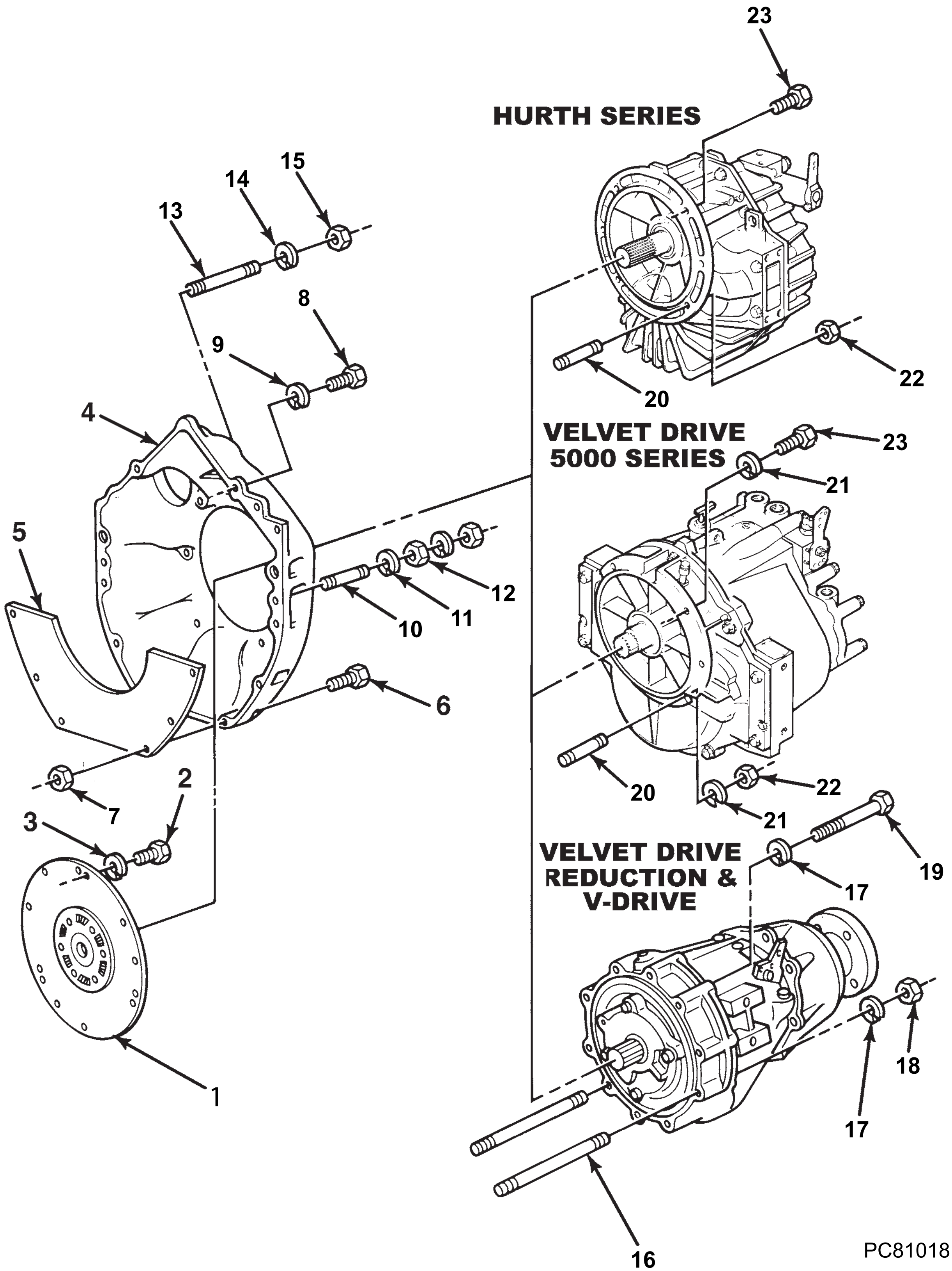
OPTIONAL REAR MOUNT -
HURTH GEAR



OPTIONAL ENGINE and TRANSMISSION MOUNTS (OEM SPECIFIC) - FIGURE 29

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RS2180	**Lockwasher**, bracket mounting bolt	6
2	RS0305	**Bolt**, socket head	4
3	RC091001	**Trunnion Assembly**	2
3A	RS1075	**Nut**, adjustment and lock	4
3B	R091001	**Trunnion, long**	2
3C	RS2186	**Lockwasher**, adjusting nut	2
4	RS1529	**Nut**, trunnion bolt - locking	2
5	RS2181	**Lockwasher**, trunnion bolt	2
6	R095020	**Bolt**, trunnion shaft	2
7	R090071B	**Bracket**, engine mounting (front)	2
7A	R090330	**Bracket**, engine mounting (front, port)	1
7A	R090331	**Bracket**, engine mounting (front, starboard)	1
8	RS7071	**Lockwasher** (12 mm)	8
9	RS6336	**Bolt**, bracket to transmission (12 mm x 60 mm)	4
10	RA092011	**Trunnion Assembly**, tall	2
10A	R091003	**Trunnion**, 2.5”	2
10B	RS1075	**Nut**, adjustment and lock	2
11	R090312	**Bracket**, engine mounting (rear - port)	1
11	R090313	**Bracket**, engine mounting (rear - starboard)	1
11A	R090328	**Bracket**, engine mounting (rear - port)	1
11A	R090329	**Bracket**, engine mounting (rear - starboard)	1

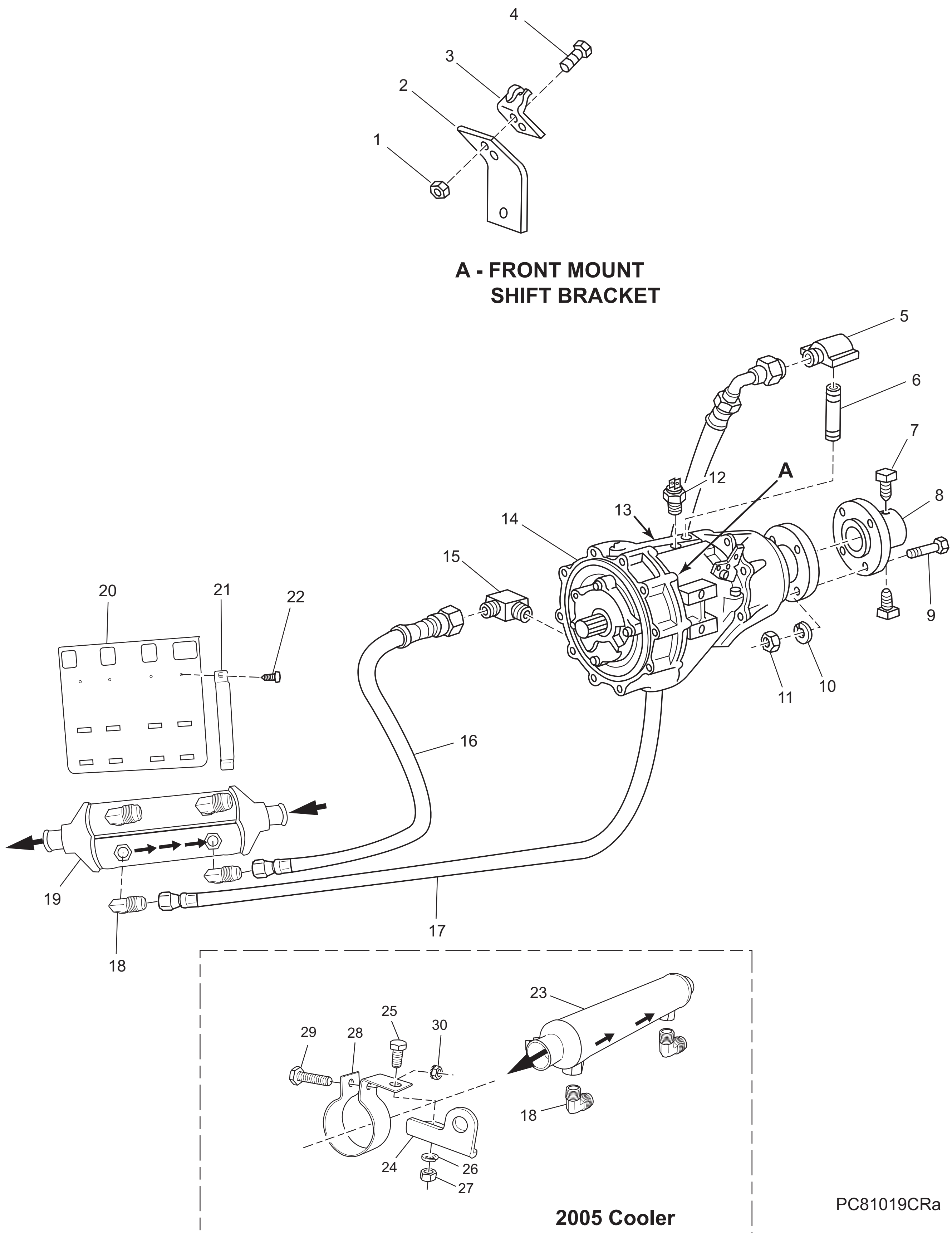
BELL HOUSING ASSEMBLY - FIGURE 30



BELL HOUSING ASSEMBLY - FIGURE 30

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R140018	**Drive Damper Assembly**, (Hurth)	1
1	98511	**Drive Damper Assembly**, (Standard Velvet Drive)	1
2	98446030	**Bolt**, damper to flywheel (1”)	6
3	93940000	**Lockwasher**, damper bolt	6
4	R142014	**Bellhousing**, flywheel	1
5	R019008	**Cover**, bellhousing (use w/top mount starter)	1
5	R019008A	**Cover**, bellhousing (use w/bottom mount starter)	1
NI	R019010	**Cover**, top mount starter (used w/R019008A)	1
NI	RS0327	**Bolt**, dust cover attaching	2
NI	RS2181	**Lockwasher**, dust cover attaching	2
6	RS0256	**Bolt**, cover to bellhousing (1”)	5
6	90105125	**Bolt**, cover to bellhousing (1 1/4”)	1
7	RS1078	**Nut**, cover bolt	6
8	98443050	**Bolt**, bellhousing to block	2
8	99443030	**Bolt**, SHCS (behind starter)	1
9	93940000	**Lockwasher**, bellhousing bolt	2
10	R031034	**Stud**, bellhousing mounting	2
11	93940000	**Lockwasher**, mounting stud	4
12	97440000	**Nut**, mounting stud	4
13	R031018	**Stud**, starter mounting (1 5/8”)	2
14	RS2181	**Lockwasher**, starter mounting stud	2
15	RS1029	**Nut**, starter mounting stud	2
		****Velvet Drive Reduction & “V”-Drive****	
16	96541	**Stud**, transmission mounting (4”)	2
17	RS2181	**Lockwasher**, transmission mounting	6
18	RS1029	**Nut**, transmission mounting stud	2
19	RS0337	**Bolt**, transmission mounting	4
		****Velvet Drive 5000 & Hurth Gears****	
20	R031018	**Stud**, transmission mounting (1 5/8”)	2
21	RS2180	**Lockwasher**, transmission mounting	6
22	RS1029	**Nut**, transmission mounting stud	2
23	RS0329	**Bolt**, transmission mounting	4

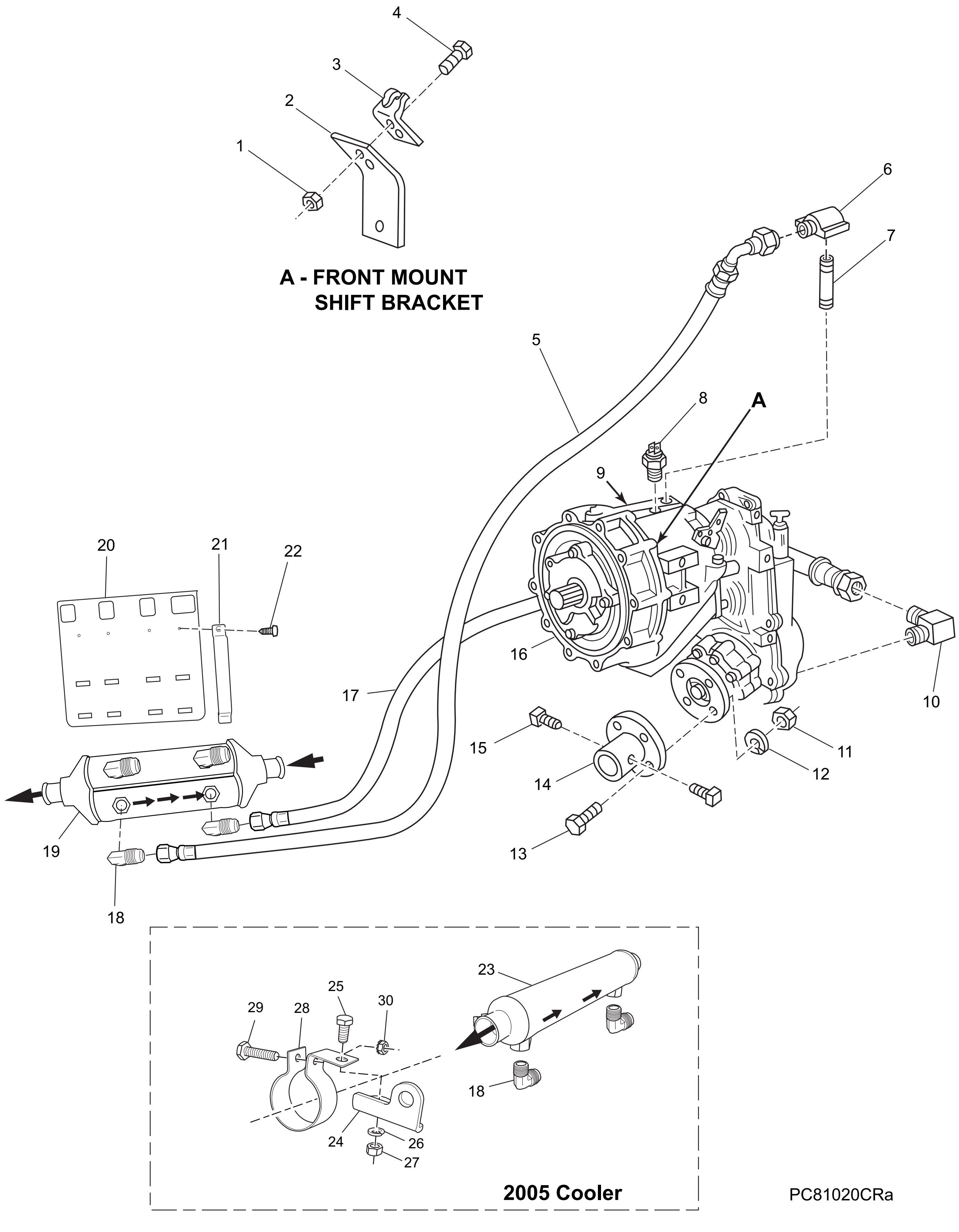
TRANSMISSION AND RELATED COMPONENTS (VELVET DRIVE IN-LINE) - FIGURE 31



TRANSMISSION AND RELATED COMPONENTS (VELVET DRIVE IN-LINE) - FIGURE 31

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RS2055	**Nut,** attaching bolt	2
2	96341	**Shift Bracket** (front mount)	1
3	R090086	**Cable Clip**, single cable	1
3	22232	**Cable Clip**, dual cable clip (not shown)	OPT
4	RS5122	**Bolt,** clip attaching (1/2”)	2
5	R024008	**Elbow,** hose - transmission (90 degree)	1
6	RS4674	**Nipple,** pipe (3”)	1
7	RS3337A	**Screw,** set - coupler	2
8	R148001	**Coupler,** prop shaft (1” shaft)	OPT
8	R148002	**Coupler,** prop shaft (1 1/8” shaft)	OPT
8	R148003	**Coupler,** prop shaft (1 1/4” shaft)	OPT
8	R148004	**Coupler,** prop shaft (1 3/8” shaft)	OPT
8	R148005	**Coupler,** prop shaft (1 1/2” shaft)	OPT
8	R148007	**Coupler,** prop shaft (1 3/4” shaft)	OPT
8	R148008	**Coupler,** prop shaft (2” shaft)	OPT
9	22136	**Bolt,** coupling (1 1/2”)	4
10	RS2181	**Lockwasher,** coupling bolt	4
11	RS1529	**Nut,** coupling bolt	4
12	R020037	**Sender,** temperature alarm	1
13	R153002	**Switch Kit,** neutral start (not shown)	1
13A	25542	**Switch & O-Ring Assembly** (not shown)	1
14	RA157001	**Transmission** (71C, 1:1 Direct Drive)	1
14	RA157002	**Transmission** (71C, 1.52:1 Reduction)	1
14	RA157003	**Transmission** (72C, 1:1 Direct Drive)	1
14	RA157004	**Transmission** (72C, 1.52:1 Reduction)	1
14	RA157004A	**Transmission** (1.88:1 Reduction)	1
14	RA157004D	**Transmission** (2.57:1 Reduction)	1
14	RA157004E	**Transmission** (2.91:1 Reduction)	1
15	R024010	**Elbow,** hose - transmission (90 degree)	1
16	RA045007H	**Hose Assembly,** cooler to transmission	1
17	RA045007N	**Hose Assembly,** transmission to cooler	1
18	R024010	**Fitting,** 90 degree	2
19	R147035	**Oil Cooler Assembly**	1
20	R090194	**Bracket,** cooler	1
21	R171007	**Strap,** cooler mounting	2
22	RS5115	**Screw,** cooler mounting	2
23	R147006	**Cooler Assembly**, transmission oil (‘05)	1
24	R090013A	**Bracket**, oil cooler attaching	1
25	RS0302	**Bolt,** oil cooler attaching	1
26	RS2180	**Lockwasher**, oil cooler attaching	1
27	RS2058	**Nut,** oil cooler attaching	1
28	R090010	**Clamp**, oil cooler mounting	1
29	RS0256	**Bolt**, oil cooler clamp	1
30	RS1028	**Nut,** oil cooler clamp	1

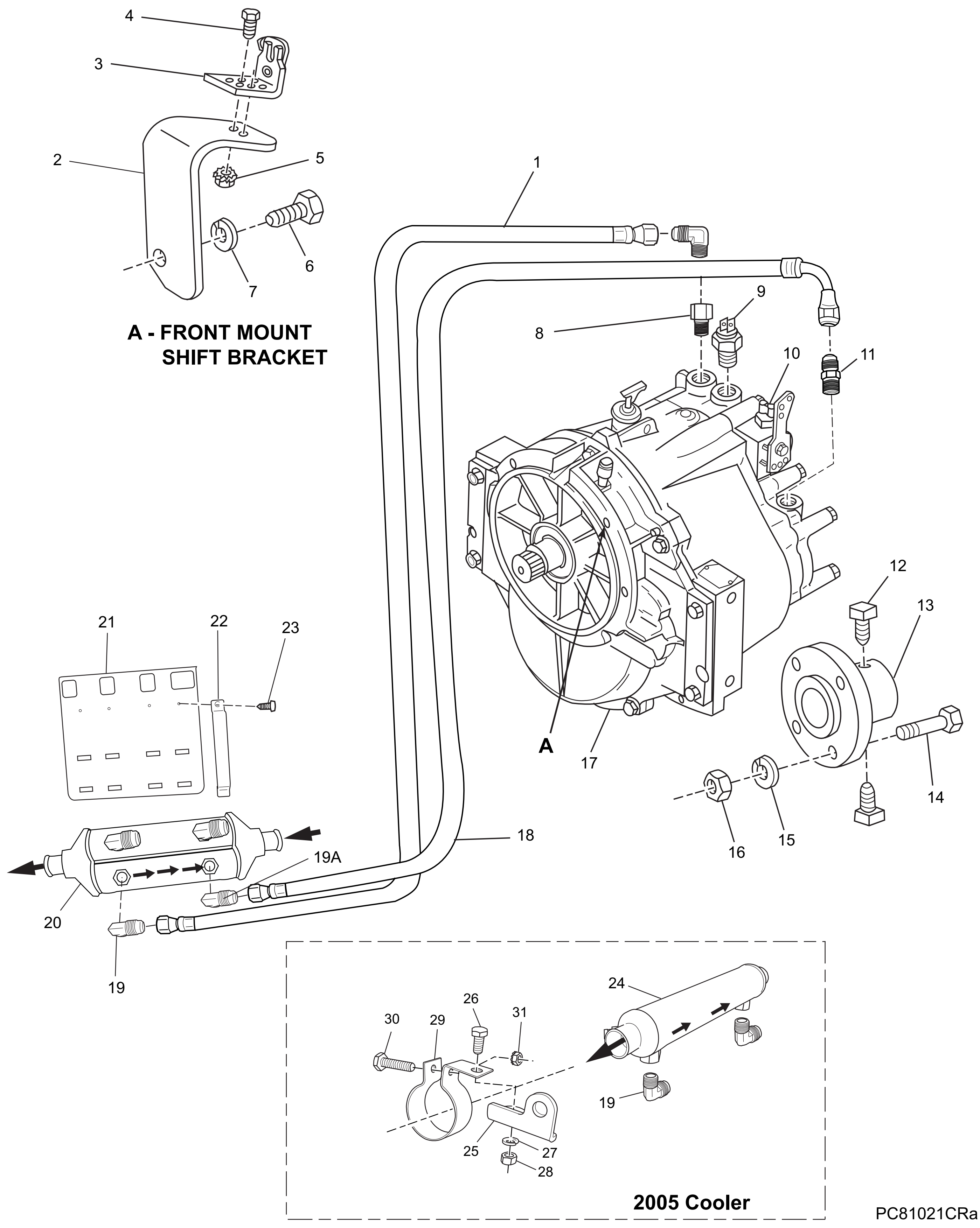
TRANSMISSION AND RELATED COMPONENTS (VELVET DRIVE “V”-DRIVE) - FIGURE 32



TRANSMISSION AND RELATED COMPONENTS (VELVET DRIVE “V”-DRIVE) - FIGURE 32

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RS2055	**Nut**, attaching bolt	2
2	96341	**Shift Bracket** (front mount)	1
3	R090086	**Cable Clip**, single cable	1
3	22232	**Cable Clip**, dual cable clip (not shown)	OPT
4	RS5122	**Bolt**, clip attaching (1/2”)	2
5	RA045007N	**Hose Assembly**, transmission to cooler	1
6	R024008	**Elbow**, hose - transmission (90 degree)	1
7	RS4674	**Nipple**, pipe (3”)	1
8	R020037	**Sender**, temperature alarm	1
9	R153002	**Switch Kit**, neutral start (not shown)	1
9A	25542	**Switch & O-Ring Assembly** (not shown)	1
10	R024010	**Elbow**, hose - transmission (90 degree)	1
11	RS1529	**Nut**, coupling bolt	4
12	RS2181	**Lockwasher**, coupling bolt	4
13	22136	**Bolt**, coupling (1 1/2”)	4
14	R148001	**Coupler**, prop shaft (1” shaft)	OPT
14	R148002	**Coupler**, prop shaft (1 1/8” shaft)	OPT
14	R148003	**Coupler**, prop shaft (1 1/4” shaft)	OPT
14	R148004	**Coupler**, prop shaft (1 3/8” shaft)	OPT
14	R148005	**Coupler**, prop shaft (1 1/2” shaft)	OPT
14	R148007	**Coupler**, prop shaft (1 3/4” shaft)	OPT
14	R148008	**Coupler**, prop shaft (2” shaft)	OPT
15	RS3337A	**Screw**, set - coupler	2
16	RA156002B	**Transmission** (1.51:1 Reduction)	1
16	RA156002D	**Transmission** (1.99:1 Reduction)	1
16	RA156002E	**Transmission** (2.49:1 Reduction)	1
17	RA045007N	**Hose Assembly**, cooler to transmission	1
18	R024010	**Fitting,** 90 degrees	2
19	R147035	**Oil Cooler Assembly**	1
20	R090194	**Bracket,** cooler	1
21	R171007	**Strap,** cooler mounting	2
22	RS5115	**Screw,** cooler mounting	2
23	R147006	**Cooler Assembly**, transmission oil (‘05)	1
24	R090013A	**Bracket**, oil cooler attaching	1
25	RS0302	**Bolt,** oil cooler attaching	1
26	RS2180	**Lockwasher**, oil cooler attaching	1
27	RS2058	**Nut,** oil cooler attaching	1
28	R090010	**Clamp**, oil cooler mounting	1
29	RS0256	**Bolt**, oil cooler clamp	1
30	RS1028	**Nut,** oil cooler clamp	1

TRANSMISSION AND RELATED COMPONENTS (VELVET DRIVE 5000) - FIGURE 33

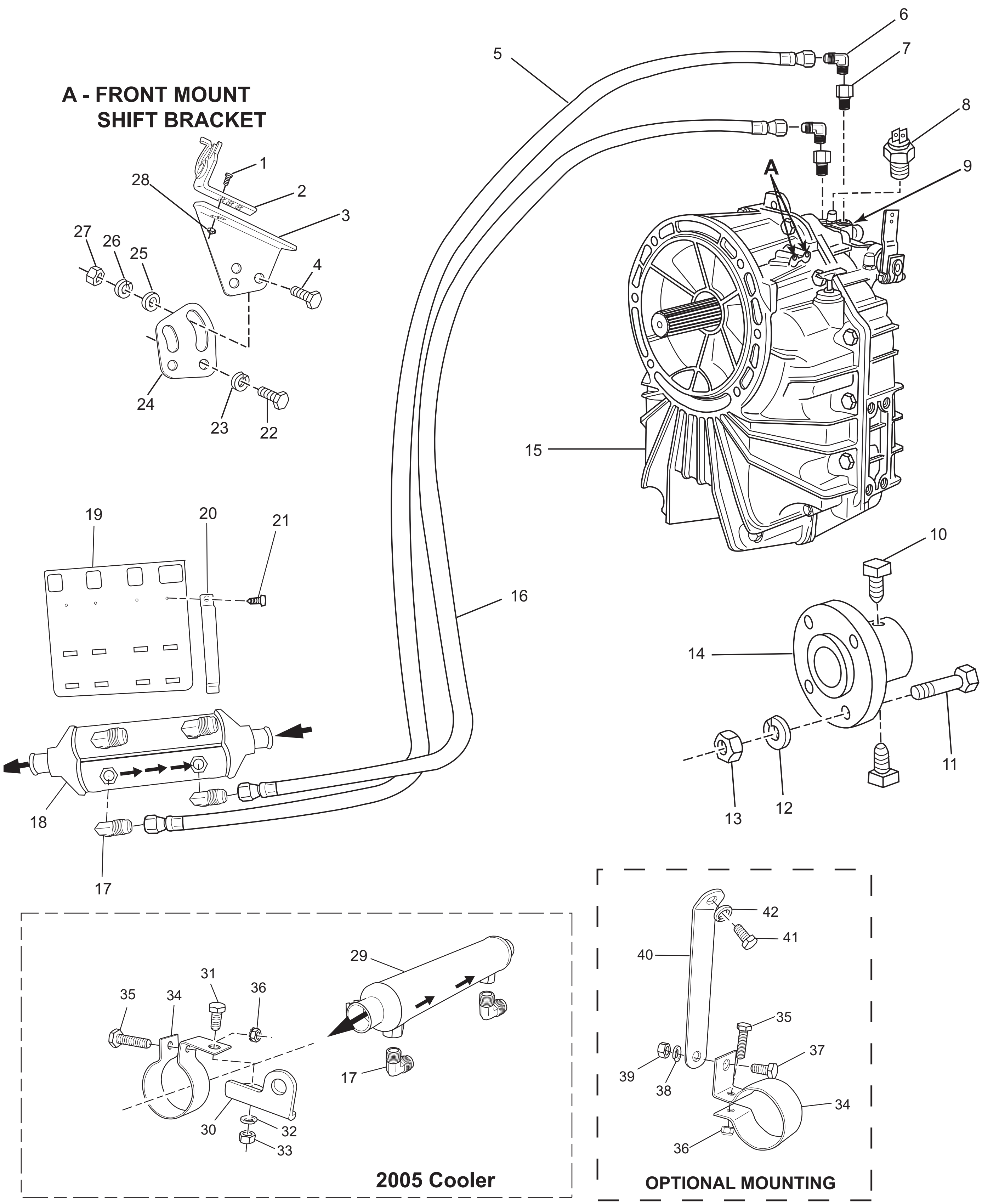


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TRANSMISSION AND RELATED COMPONENTS (VELVET DRIVE 5000) - FIGURE 33

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	RA045007T	**Hose Assembly**, transmission to cooler	1
2	98227	**Shift Bracket**, (front entry)	1
3	R090086	**Cable Clip**, single cable	1
3	22232	**Cable Clip**, dual cable clip (not shown)	OPT
4	RS5122	**Bolt**, clip attaching (1/2”)	2
5	RS2055	**Nut**, attaching bolt	2
6	RS0329	**Bolt**, shift bracket attaching	2
7	RS2180	**Washer**, shift bracket attaching bolt	2
8	R024196	**Fitting**, adapter	1
9	R020037	**Sender**, temperature alarm	1
10	25542	**Switch & O-Ring Assembly** (not shown)	1
11	30603	**Fitting**, adapter	1
12	2000090	**Screw**, set - coupler	2
13	R148001	**Coupler**, prop shaft (1” shaft)	OPT
13	R148002	**Coupler**, prop shaft (1 1/8” shaft)	OPT
13	R148003	**Coupler**, prop shaft (1 1/4” shaft)	OPT
13	R148004	**Coupler**, prop shaft (1 3/8” shaft)	OPT
13	R148005	**Coupler**, prop shaft (1 1/2” shaft)	OPT
13	R148007	**Coupler**, prop shaft (1 3/4” shaft)	OPT
13	R148008	**Coupler**, prop shaft (2” shaft)	OPT
14	22136	**Bolt**, coupling (1 1/2”)	4
15	RS2181	**Lockwasher**, coupling bolt	4
16	RS1529	**Nut**, coupling bolt	4
17	RA157020B	**Transmission** (1.50:1 Reduction) Down Angle	1
17	RA157020C	**Transmission** (2:1 Reduction) Down Angle	1
17	RA157020D	**Transmission** (2.45:1 Reduction) Down Angle	1
17	RA157020E	**Transmission** (2.80:1 Reduction) Down Angle	1
17	RA156008	**Transmission** (1.25:1 Reduction) V-Drive	1
17	RA156008A	**Transmission** (1.50:1 Reduction) V-Drive	1
17	RA156008B	**Transmission** (2:1 Reduction) V-Drive	1
17	RA156008C	**Transmission** (2.50:1 Reduction) V-Drive	1
18	18203	**Hose Assembly**, cooler to transmission	1
19	R024010	**Fitting,** 90 degrees	2
19A	137425	**Fitting,** 90 degrees	1
20	R147035	**Oil Cooler Assembly**	1
21	R090194	**Bracket,** cooler	1
22	R171007	**Strap,** cooler mounting	2
23	RS5115	**Screw,** cooler mounting	2
24	R147006	**Cooler Assembly**, transmission oil (‘05)	1
25	R090013A	**Bracket**, oil cooler attaching	1
26	RS0302	**Bolt,** oil cooler attaching	1
27	RS2180	**Lockwasher**, oil cooler attaching	1
28	RS2058	**Nut,** oil cooler attaching	1
29	R090010	**Clamp**, oil cooler mounting	1
30	RS0256	**Bolt**, oil cooler clamp	1
31	RS1028	**Nut,** oil cooler clamp	1

TRANSMISSION AND RELATED COMPONENTS (HURTH GEAR) - FIGURE 34

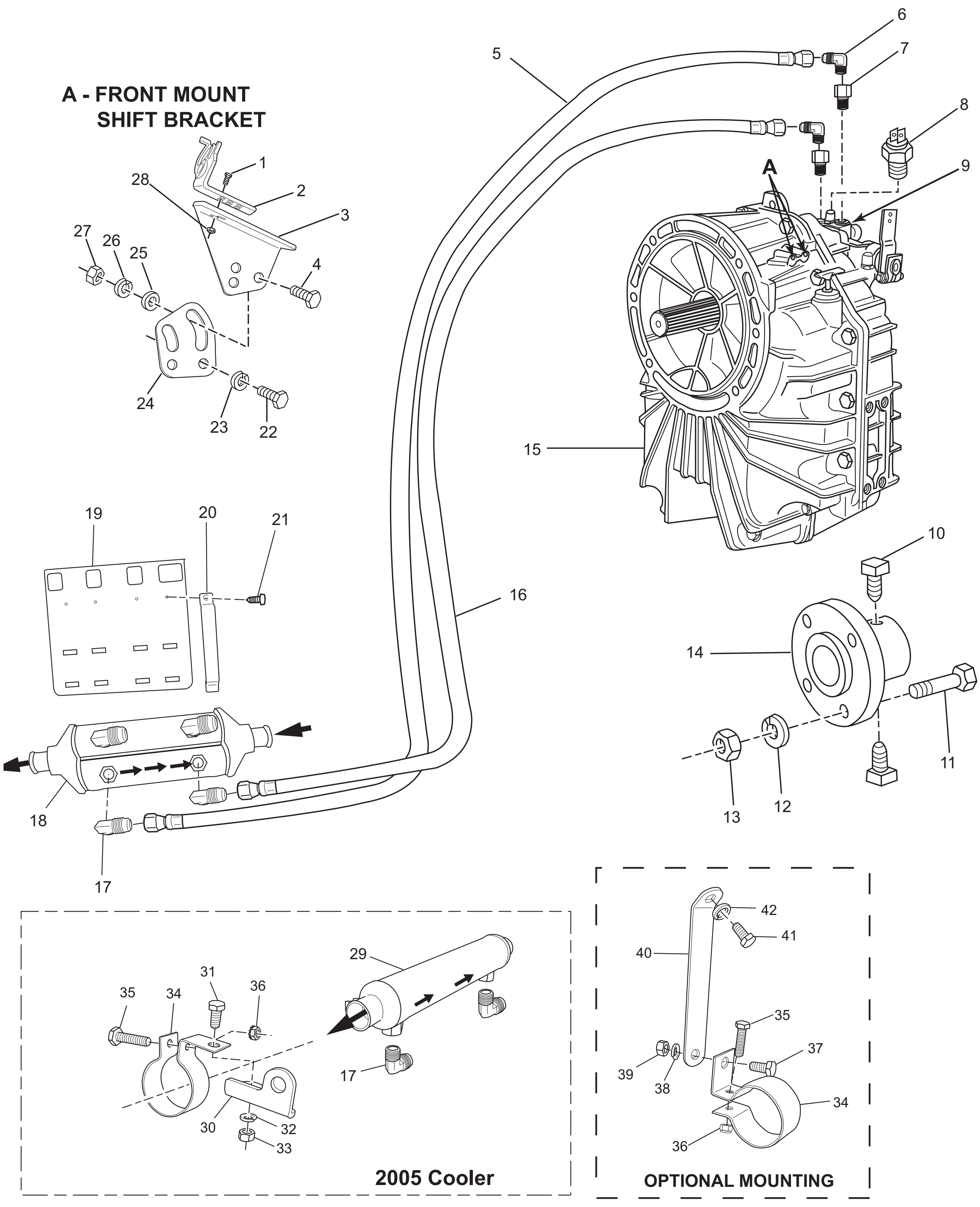


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TRANSMISSION AND RELATED COMPONENTS (HURTH GEAR) - FIGURE 34

ITEM	PART NUMBER	DESCRIPTION		QUANTITY
1	RS5122	**Bolt**, cable clip attaching		2
2	R090086	**Cable Clip**, single cable		1
2	22232	**Cable Clip**, dual cable clip (not shown)		OPT
3	R090202	**Shift Bracket**, cable clip attaching		1
4	RS0282	**Bolt**, shift bracket attaching		2
5	RA045007H	**Hose Assembly**, transmission to cooler		1
6	R024010	**Fitting**, 90 degree		2
7	R024196	**Fitting**, adapter		2
8	R020037	**Sender**, temperature alarm		1
9	25542	**Switch & O-Ring Assembly** (not shown)		1
10	2000090	**Screw**, set - coupler		2
11	90418138	**Bolt**, coupling (1 3/8”)		4
12	RS2181	**Lockwasher**, coupling bolt		4
13	RS1529	**Nut**, coupling bolt		4
14	R148001	**Coupler**, prop shaft (1” shaft)		OPT
14	R148002	**Coupler**, prop shaft (1 1/8” shaft)		OPT
14	R148003	**Coupler**, prop shaft (1 1/4” shaft)		OPT
14	R148004	**Coupler**, prop shaft (1 3/8” shaft)		OPT
14	R148005	**Coupler**, prop shaft (1 1/2” shaft)		OPT
14	R148007	**Coupler**, prop shaft (1 3/4” shaft)		OPT
14	R148008	**Coupler**, prop shaft (2” shaft)		OPT
15	RA157022	**Transmission 630A** (1.22:1 Reduction)		1
15	RA157022A	**Transmission 630A** (1.55:1 Reduction)		1
15	RA157022B	**Transmission 630A** (2.00:1 Reduction)	8° Down	1
15	RA157022C	**Transmission 630A** (2.50:1 Reduction)	Angle	1
15	RA157022D	**Transmission 630A** (2.70:1 Reduction)		1
15	RA157023F	**Transmission 800A** (2.85:1 Reduction)		1
15	RA156009	**Transmission 630V** (1.29:1 Reduction)		1
15	RA156009A	**Transmission 630V** (1.50:1 Reduction)	V-Drive	1
15	RA156009B	**Transmission 630V** (2.00:1 Reduction)		1
15	RA156009C	**Transmission 630V** (2.50:1 Reduction)		1
16	RA045007N	**Hose Assembly**, cooler to transmission		1
17	R024010	**Fitting**, 90 degrees		2
18	R147035	**Oil Cooler Assembly**		1
19	R090194	**Bracket,** cooler		1
20	R171007	**Strap,** cooler mounting		2
21	RS5115	**Screw,** cooler mounting		2

TRANSMISSION AND RELATED COMPONENTS (HURTH GEAR) (cont'd) - FIGURE 34



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TRANSMISSION AND RELATED COMPONENTS (HURTH GEAR) (cont'd) - FIGURE 34

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
22	RS6531	**Bolt**, shift bracket attaching	2
23	93930000	**Lockwasher**, shift bracket attaching bolt	2
24	R090235	**Bracket**, shift	1
25	RS2674	**Washer**, shift bracket attaching bolt	2
26	RS2179	**Lockwasher**, attaching bolt	2
27	RS1027	**Nut**, shift bracket attaching bolt	2
28	RS2055	**Nut**, cable clip attaching bolt	2
29	R147006	**Cooler Assembly**, transmission oil ('05)	1
30	R090013A	**Bracket**, oil cooler attaching	1
31	RS0302	**Bolt,** oil cooler attaching	1
32	RS2180	**Lockwasher**, oil cooler attaching	1
33	RS2058	**Nut,** oil cooler attaching	1
34	R090010	**Clamp**, oil cooler mounting	1
35	RS0256	**Bolt**, oil cooler clamp	1
36	RS1028	**Nut,** oil cooler clamp	1
37	90318275	**Bolt,** oil cooler clamp to bracket attaching	1
38	9330000	**Lockwasher**, oil cooler clamp to bracket attaching	1
39	95310300	**Nut,** oil cooler clamp to bracket attaching	1
40	R090233A	**Bracket**, oil cooler attaching	1
41	98443025	**Bolt,** bracket attaching	1
42	93940000	**Lockwasher**, bracket attaching	1
NI	RP077011	**Kit,** transmission oil filter (ZF)	AR